Industrial Standardization

Silver Anniversary Number

December 1943

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Our Front Cover: The ASA symbol as it appears in a plaque representing the American Standards Association on the Mellon Institute Building

This Issue

The Past—

Twenty-five Years—The American Standards Association 317
1. Origins. By Clifford B. LePage.... 317
2. Development of the ASA. By P. G. Agnew 322

Milestones of the ASA..... 330

Anniversary Messages—
From Our Government..... 332
From Other Countries..... 333

"A Quarter Century of Service." By R. E. Zimmerman (Annual Report) 334

The Present—

ASA Growth Curves..... facing page 317
ASA's Silver Anniversary Meeting..... 335
Events of the Year. By Dr. H. S. Osborne (Annual Report) 337
Officers for 1944..... 340
ASA Standards Activities..... 366

Standards in the War—

Standards Aid Efficiency in Federal Procurement. By Clifton E. Mack..... 341
Standards Issued by Associations and Government 346
War-Time Methods of ASA. By P. G. Agnew 347
ASA War-Time Jobs..... 348
American Safety Standards in War Production. By Colonel John Stilwell..... 351
Recent OPA Price Orders Which Refer to Standards 353
How Standards Help Meet Government Orders. By Herbert L. Spencer..... 354

Post-War—

Trends in Standardization. By P. G. Agnew 356
What Role for Standards in Post-War Production? By L. F. Adams and P. L. Alger 357
Post-War Standards for Consumer Goods. By Irwin D. Wolf..... 359
Certification of Consumer Goods—ASA Project of the Future. By Bernard L. Oser.... 361
British Mission and American Groups Confer on Screw Thread Standards for War Production and Post-War Use..... 364

News—

ASTM Announces Editorial Changes in Approved Standards 329
National Bureau of Standards Offers Standard Steel Samples..... 329
Principle of Control Chart Method Is Explained in Pamphlet..... 329
Foreign Trade Convention Endorses Inter-American Standards Work..... 329
New Book on Techniques for Industrial Safety. Review by Henry G. Lamb..... 345
New Foreign Standards Now in ASA Library 355
New Member on Inter-American Advisory Committee 355
Safety Equipment Stocks Dependent on War Needs 363
ASTM Organizes New Hydrocarbons Committee 363
Rodgers Recommends Standards for Motor Truck Parts 363
Index for 1943 to be Published in January.. 363

The Pictures—318—Jenkins & Guillo; Blank & Stroller, Inc.; 319—Blank & Stoller, Inc.; 320—Pach Bros.; 323—Lincoln Electric; 325—James Sawders; 326—Underwood & Underwood; 327—American Institute of Steel Construction; 338—Thom McAn Shoes; 339—Weston; 340—Continental by R.M.G., Inc.; Conway Studios; Bachrach; 343—U.S. Maritime Commission Photo; 351—U.S. Department of Labor; 352—Norton Co.; 354—Bendix Radio Division; 358—Allis-Chalmers; 365—Linde; 376—Johnston & Johnston.

ASA

Reg. in U.S. Pat. Off.

Standardization is dynamic, not static. It means not to stand still, but to move forward together.

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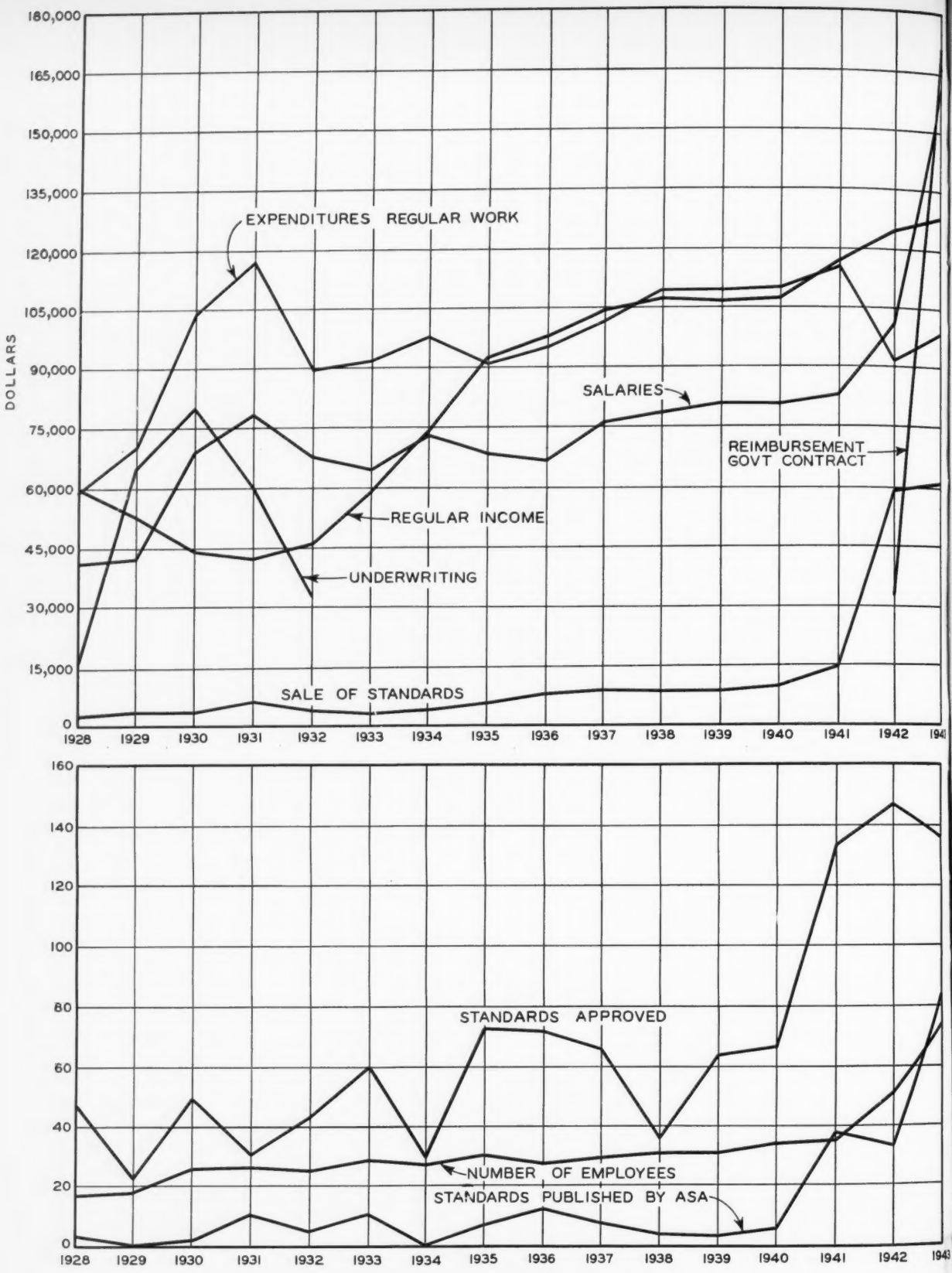


ASA GROWTH CURVES

The upper section of this chart shows the income and expenditures of the American Standards Association during the past 15 years. It also indicates the sharp increase in standards activities during the past two years as evidenced in the rise in sale of standards from only $2,000 in 1928 to $15,000 in 1941, to more than $60,000 in 1943.

The shorter curve shown between the years 1928 through 1932 indicates the underwriting which carried the ASA through the depression. The straight line running from 1942 through 1943 and showing an income of from $35,000 to $170,000 indicates reimbursement to the ASA for work done for the War Production Board and the Office of Price Administration under the contract.

The lower section shows the increase in work as indicated by number of standards approved and number of standards published by the ASA. The increase in number of employees in order to take care of the enlarged program of work is also shown on this lower chart.

Twenty-five Years—the American Standards Association

DURING the last quarter century, 1918-1943, in which industrial development has increased at an unprecedented rate throughout the world, the principle of coordinated national standards has come to be accepted as essential to modern mass-production methods. Reflecting the growth of the standardization principle in industry, the American Engineering Standards Committee was organized in 1918 as a standards-coordinating agency, by five national engineering societies. The Federal Government and trade associations affiliated with the organization the following year. After ten years of steady growth it was reorganized into the American Standards Association. It became a member of the International Standards Association in 1929.

The origins of the American Standards Association, from the first conception of it as an international organization, to the final agreement between the societies which organized the American Engineering Standards Committee on October 19, 1918, are sketched below in the article "Origins" by C. B. LePage. Mr. LePage was Acting Secretary of the AESC during the organization period from 1918 through 1919.

The development of the Association and its work during the first 25 years are sketched by P. G. Agnew in the following article "Development of the ASA". Dr. Agnew has been Secretary of the organization since December, 1919.

The more important milestones in the history of the Association, in chronological order, are noted on pages 330 and 331.

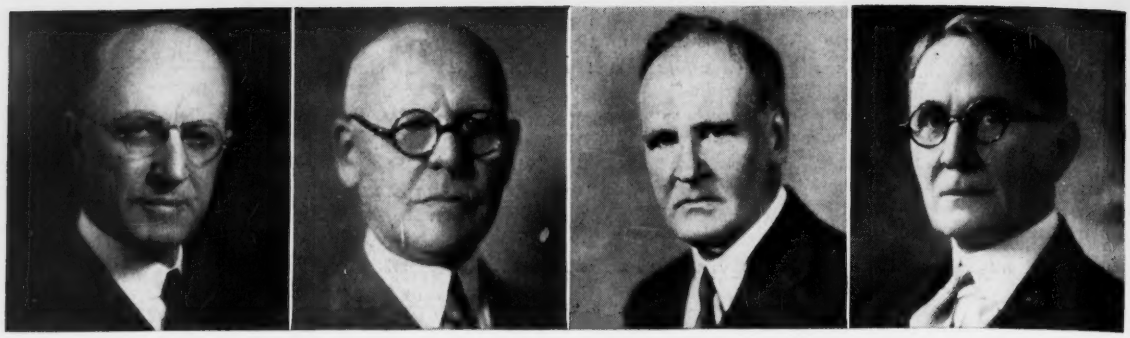
1. Origins

by Clifford B. Le Page

Assistant Secretary, The American Society of Mechanical Engineers

THE beginnings of an organization are frequently the projection of the thoughts and aspirations of a few individuals. Sometimes also the very form which it takes is greatly influenced by their personalities. To them is given the vision of the need for the new enterprise and fortunately they often have the ability and the means to develop the new idea in a way to bring lasting satisfaction and credit to themselves and to the group with which they are associated. However, the rate of progress made at the beginning is often influenced materially by the timing of the initial steps. The vision and the development of the idea must come at the right time in the history of the group.

Henry Hess of Philadelphia went on a business and social trip to Europe in 1910. There is nothing unusual about such a trip but while there he chanced to talk with Colonel R. E. Crompton, C.B., L. S. Robertson, and Charles leMaistre, and others who had been closely



Comfort Adams 1918-1919 | A. A. Stevenson 1920-1922 | A. W. Whitney 1922-1924 | C. E. Skinner 1925-1927

Chairmen of the American Engineering Standards Committee

associated with the organization and development of the British Engineering Standards Committee. At that time he was member of the Standards Committee of the Society of Automotive Engineers. This fact and this contact with our British friends stimulated him to develop a plan for the unification of the standardization activity in the United States, and the broadening of it into an international organization. It was natural for him, therefore, shortly after his return to the United States, to discuss this subject with his life-long friend, Calvin W. Rice, Secretary of the American Society of Mechanical Engineers. So in a letter written on March 7, 1911 we find him saying to Mr. Rice:

"Last summer I had the pleasure of discussing with various British engineers, notably with Colonel R. E. Crompton in detail, the matter of engineering standards of interest to the automobile field and from that we went on to a discussion of the wider field of international engineering standards. We came to the conclusion that a rapprochement of the various national technical societies would be a most desirable thing and that the time was ripe for translating this into an actuality.

"In England there is already in existence a 'Joint Engineering Standards Committee' consisting of delegates from all of the chief technical societies, as well as representatives of the Army, Navy, Board of Trade, and some of the principal engineering firms. Of this committee, Colonel Crompton is one of the most influential members and he assured me that they would be most pleased to work with other standards committees and urged on me to take the matter up, and bring it about if at all possible."

Secretary Rice's characteristic response was as follows:

"Your recommendation of an engineering standardization committee was referred to the ASME Council at its recent meeting, and in turn referred to President E. D. Meier with power to appoint a committee to report to the Council later on the entire scheme.

"The President would be pleased to receive from you suggestions as to the personnel of the committee to draft such a proposition. As soon as he hears from you he will be pleased to make the appointments."

Joint Committee Authorized

This occurred at the April, 1911 meeting of the Council and President Meier was authorized to name a committee on Joint Engineering Standards. Subsequently Henry Hess, Charles Day, Henry W. Spangler, and John H. Barr were named as this committee. Then in a letter dated August 8, 1911 we find Mr. Hess saying to Mr. Rice:

"It occurs to me that as the first meeting or two of this particular committee will be simply to acquaint its members with the object sought and for organization, and that as other similar committees are coming into existence as a result of my suggestions, all of these will probably soon meet together and that therefore these first meetings had best be rather informally called."

A memorandum signed by Secretary Rice and dated October 3, 1911 indicates some progress:

"The Chairman, Mr. Hess, reports that he is developing committees in each of the national engineering societies and he then will call a joint meeting. His policy is to propose a paid secretary as soon as there is sufficient number of societies interested to make the burden on any one society so slight that the whole movement would be assured of success."

International Scope Visualized

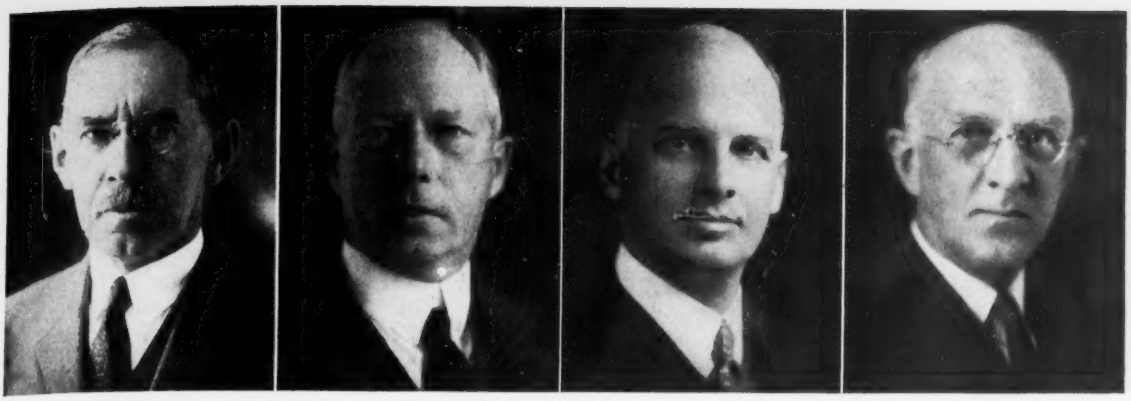
The next letter of importance in the files was addressed to F. L. Hutchinson, Secretary, American Institute of Electrical Engineers, on May 23, 1912:

"Work that I have been called upon to do in connection with various committees on standardization of various machine elements and in various engineering bodies has forcibly brought home to me the desirability of a joint action on the part of various societies. It has been my experience that different bodies were at the same time working along similar lines and in more or less complete ignorance of the work the others were doing.

"Careful consideration of the matter led me to the conclusion that in these days, characterized as they are by an active interchange by the export and import of machinery and apparatus, standardization should take on a wider than a merely national scope, it should in fact be international. It is today hardly possible to bring about absolutely international action, although to some certain extent this has already been done, as, for instance, by your society in connection with the standardization of scientific terms and quantities; and again similar work is being done by the International Association for the Testing of Materials.

"In England there is already in existence a 'Joint Engineering Standards Committee' consisting of delegates from all of the general technical societies as well as representatives of the Army, the Navy, Board of Trade, and some of the principal engineering firms. In the United States The American Society of Mechanical Engineers, the American Institute of Mining Engineers, the Society of Automobile Engineers, and the Engineers' Club of Philadelphia have joined the movement.

"My plan is that every engineering society or technical body having any interest in standardization work of any kind would form a special Joint Engineering Standards Committee. Such committee in order not to be unwieldy should consist of from one to three members, depending upon the size and the activities of the body in question. These various (National) Joint Engineering Standards Committees would meet together at a suitable time—that is to say when a sufficient number had been formed—and would form from among themselves an International Joint Engineering Standards Committee, which in turn would appoint a secretary. Every committee dealing with a standard of any kind from any one of the various bodies would transmit copies of its proceedings immediately to the Secretary of the Joint Engineering Standards Committee of its organization



ASA Presidents

Top (left to right)—W. J. Serrill (1928-1930); Bancroft Gherardi (1931-1932); Howard Coonley (1933-1935); D. D. Barnum (1936-1938).

Left—E. A. Prentis (1939-1940).

Right—R. E. Zimmerman (1941-1943).

That secretary would in turn transmit this matter to the Secretary of the Central Committee and he would see to its duplication, if necessary, to its translation, and would transmit a copy to everyone of the various organizations in interest. In this way every committee anywhere in the world working on a given subject would have prompt knowledge of the work that was being done everywhere. The possession of this prompt knowledge would then very naturally lead to an interchange which would in all probability result most usefully.

"The further working out may well be left to time, since unquestionably, an experience under the tentative plan outlined will show the need for still closer mutual action and will also suggest the most feasible methods.

"Might I suggest that you take this matter up with the proper parties in your organization and secure the appointment of a committee of say three members?"

Suggests Use of IEC

This letter by Mr. Hess was referred to Professor Comfort A. Adams, then Secretary of the AIEE Standards Committee. Professor Adams' response was prompt and direct:

"Your letter of May 23, 1912 to Mr. F. L. Hutchinson, Secretary of the AIEE, has been referred to me. I shall read your letter to the next meeting of the Standards Committee to be held June 24th in Boston, at the time of the Annual Convention of the AIEE. Your suggestions are very pertinent and will undoubtedly receive serious consideration. It may interest you to know that a considerable and very important work in the line of international standardization is being accomplished through the medium of the International Electrotechnical Commission, of the United States Committee of which I am also a member. As you will doubtless appreciate, it is a very tedious and difficult matter to get such international organization into successful operation, and even then the results are apt to come very slowly. The IEC has, however, been distinctly successful in certain vital and fundamental matters relating to electrical units and standards. If any of the subjects in which you are interested could rightly be referred to this commission, it would doubtless be to your advantage to make such reference—at least, it might save a good deal of time over any other order of operations."

The breadth of Mr. Hess' conception is indicated by the following two paragraphs taken from his reply to Professor Adams dated June 10, 1912:

"The formation of the international committee that I suggest is entirely apart from any work of actual standardization. This proposed committee is to act solely as a central bureau for the exchange of information between all technical bodies directly or indirectly interested in standardization. A few such bodies are already directly exchanging information and a smaller number are acting together and to very great advantage.

"The proposed committee will bring together all bodies interested in standardization of similar lines, by informing each body promptly of the proceedings of every other body engaged in similar standardization. With that exchange of information the proposed committee ceases its activity; the discussion of standards and their recommendation will remain as now with each association, society, institute, etc, except in so far as they may decide to act more closely together, as for instance in the case of your International Electrotechnical Commission and also of the International Association for Testing Materials."

At the ASME Council meeting held on May 30, 1912 the following action was taken:

"VOTED: that this Society officially invite the sister engineering societies of the world to appoint committees similar to our own Committee on Standards and, upon the receipt of a sufficient number of acceptances in the judgment of our Committee on Standards, that a conference be called of these, or delegates from these committees and societies, for the formulation of a clearing house to assist in the formulation of standards for the engineering profession."

These letters were written by Secretary Rice in June and July, 1912. The one addressed to the AIEE then assembled in convention in Boston was dated June 26, 1912. It conveyed much of the same information contained in Mr. Hess' letter to Secretary Hutchinson and formally invited the AIEE to appoint a committee to confer on this subject.

Professor A. E. Kennelly, chairman, and Professor C. A. Adams, secretary, AIEE Standards Committee,

Clifford B. LePage
First AESC Secretary
1918-1919

signed that society's reply to Mr. Rice's letter. It suggested a joint committee on standards maintained by the engineering societies at the Engineering Societies Building under an arrangement similar to that for the Engineering Societies Library. It read as follows:

"Your letter of June 26th addressed to Secretary Hutchinson of the AIEE on the subject of a central bureau of information on standardization has been received by the Board of Directors of the American Institute of Electrical Engineers and has been referred to this committee with power.

"It seems at first sight that such a joint means of intercommunication between engineering standardizing committees should be primarily established by and between the national engineering societies at their headquarters, the Engineering Societies Building in New York, in somewhat the same manner as these societies now maintain a common library and library committee. After such a national engineering societies' joint standardization committee shall have been established, the representation to it from engineering clubs and societies all over North America can be equitably and effectively provided for. In such a manner the work can be prosecuted to the greatest benefit of engineering with the maximum effectiveness and minimum expense. In other words, we are of the opinion that after the national engineering societies shall have formed a joint standardizing committee with equal joint representations from the individual sister societies, this joint committee would be in a position to carry on the work of disseminating information concerning standards among all engineering bodies more effectively and inexpensively than in any other way.

"We shall, therefore, be very glad to attend the conference of our sister engineering societies, in the manner you suggest, at a mutually convenient date in New York, N. Y. as representatives of the American Institute of Electrical Engineers, and its Standards Committee. Kindly inform us when such a conference can be arranged. We think it should be within the next ten days."

Mr. Hess' reaction to this modification of his proposal is characteristic and interesting. It is dated July 9, 1912.

"The suggestions made by the American Institute of Electrical Engineers Standards Committee are along lines that are to be considered later. It may be that action along the line suggested would be the best. No doubt that would be the case so far as American societies alone are concerned. The proposed bureau, however, is to be not a national one but an international one and it may be that work such as that of this bureau could be carried on at less cost in Europe than here. It is easier to procure in Europe the services of people having a thorough command of various languages than it is to secure similar services here and such services are undoubtedly to be had at a far less cost there than here.

"However, all this is a matter for future consideration to be taken up when the various committees that are to be appointed by various societies will meet.

"For the present I think the proper action is to secure the appointment of committees from the various national and European technical bodies, these committees to meet later when a sufficient number have been appointed.

"At such later meeting the details of the organization of a central bureau are to be considered."

Joint Meeting of Electrical and Mechanical Engineers

Jumping to January 6, 1913 we find that some further progress has been made. This is recorded in an AIEE letter to Secretary Rice.

"As you will have already been informed, in regular course a joint meeting of the Standards Committee of the AIEE and the Committee especially appointed for the conference by the Council of the ASME, took place on December 13, 1912, and certain joint resolutions were unanimously adopted.

"The joint meeting of the two committees was so successful in cordiality and in results that we are impelled to believe a standing arrangement for its repetition at suitable intervals would be of benefit to both the Society of Mechanical Engineers and the Institution of Electrical Engineers. There are many matters of importance to mechanical and electrical engineering jointly, which might be advantageously discussed by joint Standards Committees; for example, the Best Method of Rating and Testing Turbo-Generator Units, which do not admit of being tested independently as turbine and generator components; or again, the possibility of adopting the 'Kilowatt' more generally, as a unit of power, in place of the 'Horsepower', for any or all types of machinery. In this way a splendid opportunity would be offered for attaining cooperative standards in mechanical and electrical engineering; as well as sealing a new bond of cordiality and mutual aid between the two societies."

War Interrupts Standards Plans

There is a gap of three full years in the ASME correspondence files at this point, probably the beginning of World War I diverted attention from this national and international project. Then at a meeting held on February 11, 1916 of an ASME Special Committee which studied Mr. Hess' paper entitled "Report of Committee on Bureau of Engineering Standards" it was unanimously agreed that the American Institute of Electrical Engineers, the American Society of Civil Engineers, and the American Institute of Mining Engineers be approached with the object of forming a joint committee for the purpose of giving consideration to the cooperation of these societies with the American Society of Mechanical Engineers to cover the entire work of standardization in its various phases and with a view to the avoidance of duplicate effort and working at cross purposes.

The leaven was still at work also in the AIEE, for on March 13, 1916 Professor A. E. Kennelly wrote to Mr. H. Hess as follows:

"The Standards Committee of the AIEE has been very desirous of entering into active cooperation with similar committees from the other engineering societies for a number of years. It is a reflection upon our American engineering institutions, is it not that the British have a federated Engineering Standards Committee, with representations from all the important societies whereas we have not?

"I should think that if The American Society of Mechanical Engineers is also desirous of entering into such a cooperative

rangement, as I gather from your valuable report, it should be possible to make a start without delay. My own idea would be that each of the four national engineering societies (ASME, AIME, ASCE, and AIEE) should have their individual standards committees. These Standards Committees should be empowered by their respective Boards to cooperate, say once a year at the outset, so as to hold a joint Standards Committee meeting. At the first joint meeting of this character a permanent organization should be initiated for a standing federated Engineering Standards Committee, in which all the contributing societies shared alike. The chairmanship of the federated committee would go in annual rotation to each of the contributing societies. The expense of printing would be distributed uniformly. The votes of each society at such meeting would be uniformly apportioned: say two to each contributing society: but any member of the individual Standards Committees would have the right to attend the meetings and take part in the discussion. The resolutions of the joint federated meetings would not become officially binding on the parent societies until ratified by a suitable majority of their Boards of Direction, and even a minority board should have the power to reject any joint resolution as applied to its own membership. Any unratified resolution would automatically be laid on the table. By-laws for the guidance of the federated body could be passed after the first meeting.

"A step in the direction of this federated Engineering Standards Committee might be brought about this year before the end of June, I think, if even only two societies such as the ASME and the AIEE would agree to make a start. If you would try to obtain suitable action on the part of the ASME, I will do my best to have corresponding action taken by the AIEE: although of course I cannot promise that this action will be adopted. The main idea is that no one society shall seek to dominate the situation, but that each should endeavor to assist all the others. The benefits thus obtainable, I believe you would agree, would be enormous."

Joint Conference Committee—1916

On August 7, 1916 prompted by the action of the AIEE Board of Directors (June 28, 1916) Secretary F. L. Hutchinson addressed the following letter to the ASCE, AIME, ASME, and the ASTM:

"At a meeting of the Board of Directors of this Institute, held during our annual convention at Cleveland, June 28, a resolution was unanimously adopted to invite the four national societies named above to appoint three representatives each, who, together with three representatives from this Institute shall meet in conference to consider and report back to their respective societies on ways and means of bringing about cooperation in American engineering standards.

"If your society concurs in this proposed Joint Conference, and if you will advise me the names of your representatives, I shall be glad to arrange to call the first meeting of the representatives of all the societies concerned."

The action taken by the ASME Council on October 13, 1916 was as follows:

"In response to the invitation of the American Institute of Electrical Engineers for appointment of three representatives on a proposed joint committee of the four national engineering societies to meet in conference to consider and report back to their respective societies on ways and means of bringing about cooperation in American engineering standards.

"VOTED: that the matter be referred to the Committee on Standards with power to appoint three of its members to confer with a like number of members of the other societies, acting as representatives on this joint conference committee."

On December 29, 1916 the first meeting of the Joint Conference Committee on American Engineering Standards was held. W. F. Kiesel, Jr. and Carl Schwartz represented the ASME at this meeting on December 29, 1916 and included the following statement in their report to Chairman Hess:

"The result was that, upon motion by Mr. J. A. Capp, the committee unanimously agreed that the representatives should report to their respective societies and recommend the formation of an American Engineering Standards Committee, and, further, suggest that the members of the Joint Conference Committee be authorized to act as an organizing committee.

"It was further suggested that it would be desirable to ask the United States Government to appoint representatives to the future American Engineering Standards Committee, and Professor Adams, having already discussed the matter with government representatives, will confer further with the Secretaries of the United States Navy, United States Army, and the Bureau of Standards.

". . . It seems to us that none of the engineering societies can be compelled to have its standardization work passed upon by the Standardization Committee, though, undoubtedly, the stamp of approval on the part of a Joint Standardization Committee would give standards created by any one of the societies additional strength. What might be done is that, while each society reserves entire liberty of action, it might obligate itself not to recognize a standard created by another society unless it bore the stamp of approval of the Joint Committee."

Hess Urges Effective Joint Action

One paragraph of Mr. Hess' response to this report is interesting.

"The real problem to be solved by the Organization Committee, when that is constituted, is to work out a basic classification for standards in general, the basic constitution and makeup of the subcommittees dealing with such standards, then to study these with reference to the Charters, Constitutions, and By-Laws of the National Societies, then to modify and compromise and finally to report the conclusions arrived at to the various Societies so that these may, if necessary, modify their Constitutions, etc., to permit really effective joint or national standardization."

H. Hess, H. L. Gantt, Carl Schwartz, and W. F. Kiesel, Jr., were named as the ASME representatives to attend the second meeting of the Joint Conference Committee held sometime in March 1917 at which a Subcommittee on Organization consisting of H. Hess, H. J. Latey, A. A. Stevenson, G. C. Stone, and C. A. Adams was appointed. This subcommittee met on April 7th and the records show that the Joint Conference Committee held three meetings and the subcommittee held three meetings in addition. Then on June 19, 1917 the Joint Conference Committee presented its report to the governing boards of the five societies which had appointed it. This report includes (1) Preamble, (2) Constitution, and (3) Rules of Procedure of proposed American Engineering Standards Committee. This report was approved and accepted by four of these societies, the fifth suggested a different form of organization. Nine months later a meeting of the Subcommittee on Organization of American Engineering Standards Committee was held at which a revision of the proposed constitution and Rules of Procedure of the AESC was drafted and on April 10, 1918 President Charles T. Main wrote the following letter to Chairman Hess:

"The project to create an American Engineering Standards Committee has now been under way for a year or more. If my memory serves me correctly, a Constitution and By-Laws were drawn up by the Joint Conference Committee, and were submitted to the five national engineering organizations, and were approved by four of these five.

"It is, of course, very desirable that all five should approve of such initial Constitution, but it is more important that the committee be actually created, and such creation be not held up until absolute unanimity is had. With any new organization perfection cannot be expected at the start, but it is necessary to make a start in order to accomplish results. Minor defects can be eliminated, if any appear, as the work progresses.

"Can you not suggest, as the representative of this Society on that Joint Conference Committee, that it proceed definitely to the final organization on the basis of the approval of a majority of the five national societies interested; can it not get promptly into actual existence with at least three, if not all five,

of the founders? The work before such a national committee seems to be so important, and also, its coming into existence at this particular time seems to me to be so important, that I urgently request you to endeavor to persuade the committee to bring this about at the earliest possible date. It has already been delayed too long."

The Subcommittee on Organization held another meeting on May 4, 1918, the Constitution and Rules of Procedure were further revised, and within the next few months they were approved by the governing boards of the five societies. The organization meeting of the American Engineering Standards Committee was held in New York on October 19, 1918.

At last an organization was started in the United States whose principal purpose was to unify the activities of the various standardization agencies in the country and to serve as a clearing house for the work of these agencies. It was not exactly the organization which Henry Hess had planned. It had no international function. Circumstances beyond the control of the group associated with him had made necessary a postponement of this step. He was fifteen years ahead of his time. The International Standards Association was not organized until 1929. To him, however, goes much credit for planting seed thoughts on international cooperation which have grown to a tree of sizeable proportions.

He succeeded also in unifying the standardization activities of the American Society of Mechanical Engineers and in laying the foundations for the Society's close functioning with the AESC and the ASA in its national and international activities.

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2. Development of the ASA

by P. G. Agnew

Secretary, American Standards Association

THE American Engineering Standards Committee held its organization meeting in the Engineering Societies Building, New York, October 19, 1918. The Committee consisted of 15 men representing five national engineering societies:

American Society of Civil Engineers
- John H. Gregory
- Martin Schreiber
- Harry N. Latey

American Institute of Mining and Metallurgical Engineers
- George C. Stone
- Joseph W. Richards
- Arthur L. Walker

American Society of Mechanical Engineers
- Henry Hess
- Henry H. Vaughan
- Wm. F. Kiesel, Jr.

American Institute of Electrical Engineers
- Comfort A. Adams
- H. M. Hobart
- N. A. Carle

American Society for Testing Materials
- J. A. Capp
- A. W. Gibbs
- A. A. Stevenson

These men had formed the organizing committee.

Nearly two years had been spent in endless discussion and in formulating innumerable drafts of constitutions and methods of procedure before the committee's final recommendations were approved by the five societies. Professor Comfort A. Adams was elected as the Committee's first chairman, as he had been of the organizing committee.

The American Engineering Standards Committee started with an ambitious program but with little else. Each of the five societies had subscribed $1,500 a year to get the organization started. During the early period, the American Society of Mechanical Engineers, whose secretary, the late Calvin W. Rice, had been one of the leaders in starting the Committee, provided the services of a member of its staff, C. B. LePage, as acting secretary. Mr. LePage served until December, 1919, when I started as full-time secretary. The first year the staff consisted of two stenographers and myself.

The Committee was originally set up with the idea that the administrative control of the organization should rest in the hands of the five engineering societies, but the first fundamentally important job that came along—the development of an extensive program of national industrial safety codes—challenged this idea.

Industry as represented in the trade associations flatly refused to cooperate with an organization which it considered entirely too undemocratic and narrow in its set-up to be entrusted with so important a program. Industrial executives insisted that, since the codes were to serve as regulations legally enforced by governmental agencies and under which industry must live, both governmental agencies and industry should be privileged to share in the administrative control on the same basis as the engineering societies. Practically the entire first year was spent in a thorough re-organization to meet these criticisms, and late in 1919 trade associations and governmental bodies accepted membership on the governing body of the AESC.

"States' Righters" vs "Federalists"

In setting up the national organization the main purpose had been to provide an effective channel of cooperation between the many national groups engaged in standardization activities, without hampering their own valuable undertakings. There was a fundamental difference of opinion as to whether or not this should take the form of a strong central organization.

Soon after taking up the work as secretary of the

Most of this sketch is taken from the article "Twenty Years of Standardization", INDUSTRIAL STANDARDIZATION, Vol 9, p 229, Oct. 1938.

AESC, I discovered, not without considerable foreboding, that the fundamental issue had not really been solved but had been merely obscured by drafting the Constitution and Rules of Procedure in such general terms that each party read into these documents its own interpretation. This has frequently been referred to as the controversy between the "states' righters" and the "federalists."

The "states' righters" wanted the new organization held to a purely formal, if not nominal, relationship to the actual work of the development of standards to make sure it would not interfere in any way with their work. The "federalists," on the other hand, wanted a strong national body, and felt that this could be accomplished without serious interference with the work of the cooperating bodies. The "federalists" held that if a strong national organization were not developed, the approval of standards would degenerate into a rubber-stamp procedure—as though an organization handed a completed standard through a window, had it rubber-stamped with ASA approval, and passed it along as an American Standard. This, they warned, would eventually result in the elimination of the "rubber stamp."

Solution of this difficulty was to constitute the most important problem before the AESC for a number of years—in fact, until the reorganization of the AESC into the American Standards Association in 1928. Even yet it bobs up in attenuated form on occasion, and will probably continue to do so for years to come.

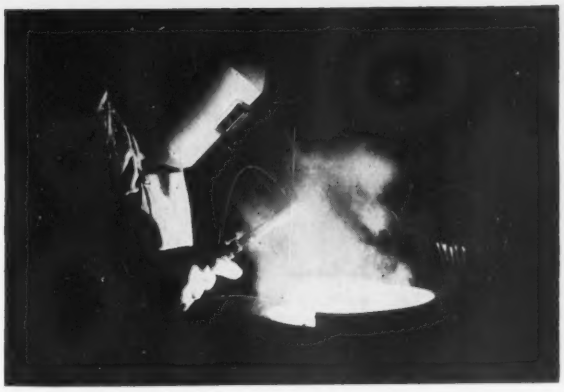
"Representatives of Their Own Choosing"

A controversy over the make-up of sectional committees illustrates the differences of opinion at that time as to the method of functioning of the AESC. The orginal Rules of Procedure made it possible for a sponsor organization, when submitting a standard to the AESC for approval, to submit also a list of members of that committee, indicating opposite the name of each individual to what society that individual belonged. These societies, although they had had no voice in naming the committee members, were then considered to have been represented in developing the standard. This controversy centered around the question whether representatives on committees should or should not be "representatives of their own choosing." The question came up in a meeting of the AESC in July, 1920. There was a sharp division of opinion in the Committee, but the matter was finally settled when Dr. Rosa of the National Bureau of Standards spoke strongly for "representatives of their own choosing" and turned the tide of opinion in favor of this change. No one now would think of bringing up such a question.

As another example, the original Rules of Procedure provided that no American Standard could be revised more often than once in three years. One of the strong points of the present policy of the Association is that no standard is considered static, but prompt changes to meet changing conditions are always encouraged.

This "period of the anguish of internal adjustment," as it was sometimes called, lasted through 1921, during which time the technical work was well launched, and these problems of policy were clarified.

By 1928 the expansion of the work had led to "growing pains" which necessitated a fundamental reorganization. This also proved to be a long and, at times, a painful undertaking. It resulted in the change from



Need for safety standards brought AESC enlarged membership and greater scope.

a committee organization, which had been completely outgrown, to a full-fledged association, including changing to the present name. One can compare the history of the ASA to that of our National Government. The AESC corresponds to the government under the articles of confederation; the American Standards Association as reorganized in 1928 corresponds to our national government under its present constitution.

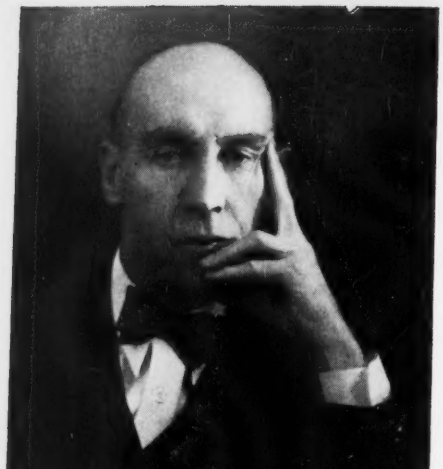
Opinion on the reorganization was divided, and again the controversy between the "states' righters" and the "federalists" arose.

The proposed change in name came to symbolize the various controversies. A striking incident at this time seems to me to well illustrate the spirit of ASA methods. The late J. A. Capp, a representative of the American Society for Testing Materials, who had been a member of the original organizing committee, warmly announced in the early stages of reorganization that the name "American Standards Association" would be adopted only over his dead body. But Mr. Capp was a man who was not afraid of reversing his stand and he himself seconded the final resolution recommending the adoption of the complete reorganization plan, including the new name.

Organizations Cooperated

Several successive reports by the committee working on the reorganization plans were flatly rejected by the Main Committee, and the reorganization might not have been completed had not S. L. Nicholson of the National Electrical Manufacturers Association suggested that the organizations having an interest in the proposal be invited to name representatives on the reorganization committee. Seventeen took advantage of this opportunity, and for several months their representatives met every week to thresh out differences of opinion. Admiral Rock of the U. S. Navy, for instance, made the trip from Washington to New York week after week to attend these meetings.

The final plan of reoganization, including the setting up of a Board of Directors, the change of name, liberalization of methods, including "autonomous" technical committees and "proprietary sponsorships," won unanimous approval in all stages. The enlarged Rules Committee, the AESC itself, and each of the 36 national organizations constituting the Member-Bodies,



P. G. Agnew
ASA Secretary, 1919—

accepted unanimously the entire reorganization as proposed. It became effective in 1928.

Safety Codes Bring Reorganization

The program for the development of national safety codes—the first important job to come before the American Engineering Standards Committee—was begun in 1920, almost before the AESC organization had been completed.

About 1912 public agitation had made workmen's compensation a national policy, and industrial accidents a matter of dollars and cents. Then for the first time industrial safety became recognized as a problem for industrial management, and states began enforcing safety regulations.

There being no clearing house for the regulations of the different states, conflicts occurred. One type of electric motor, in order to be legally safe in the State of Pennsylvania, had to be legally unsafe in the State of Wisconsin, and vice versa. As these problems grew in importance, it became increasingly evident that some machinery would have to be set up to bring together manufacturers, employers, employees, state regulatory bodies, insurance companies, and safety organizations to work out standards on which the state regulations could be based.

In 1919 a conference called at the suggestion of the National Bureau of Standards came to the conclusion that there was no organization except the American Engineering Standards Committee which could logically undertake so comprehensive a program.

But, as I have said before, industry refused to co operate until the AESC had been reorganized, and it was not until after a second meeting at the National Bureau of Standards, where the AESC reported its organization plan, that the safety code program was actually agreed upon. The Safety Code Correlating Committee, which paved the way for the present ASA system of general industry committees, was organized early the following year to supervise and coordinate the work. This work has resulted in a consistent set of some 60 American Standard Safety Codes, which now form the backbone of the regulations of the state governments for the protection of workmen. They are used by insurance companies, both stock and mutuals, in advice to their assured, and by manufacturers and employees.

Industrial Disease Prevention

In 1938, the Association went further and extended its work to the field of industrial disease prevention. A working committee on toxic dusts and gases started active work by setting limits on the amount of such substances to be permitted in the atmosphere of work places. With the coming of the War Production Program, this work became urgent, and the War Procedure has been applied to several of these undertakings.

Although the safety code program has been remarkably effective, it has had its difficulties. For example, the Safety Code for Abrasive Wheels was held up for almost a year because of a controversy over a patent. And yet this code is now one of the most universally used of all the American Standards and represents one of the most thoroughgoing jobs ever done by the ASA. The code has now been given 100 percent acceptance by regulatory authorities, manufacturers, and users.

Very early in the development of the safety code work, the question of labor representation threatened to wreck the entire program. An anti-labor man bitterly opposed the policy of permitting a representative of a labor union to sit on his committee. Finally, however, an arrangement was made whereby the U. S. Secretary of Labor was to be requested in each case to provide employee representation on the technical committees working on standards. The Secretary then goes to the union or unions in that field, asks for nominations for committee representatives, and appoints these nominees as the official representatives of the U. S. Department of Labor. A few years ago, the Association had occasion to review this entire question, and reaffirmed this arrangement for employee representation. The preferred method of representation is still through the U. S. Department of Labor, but direct union representation is also permitted.

Mining Standards

The mining work, started in 1920, represents the one program of the Association which has decreased rather than increased in importance. Prior to organization of the Mining Standardization Correlating Committee, a group of "first edition" mining standards had been submitted to the Association. Before taking any action on these standards, the ASA called a conference bringing together the various organizations in the mining field. At first, strong inter-organization jealousies made the prospect for constructive action seem hopeless. Opposition to any cooperative action was freely expressed. During the first meeting, however, frank discussion of the problems took place and by the end of the day it was unanimously agreed that the mining program should go forward. A motion to organize the Correlating Committee was made by one of the men who had at first shown the most determined opposition to cooperative work.

One important mining standard, on rock dusting of coal mines, has been extensively adopted and has saved hundreds of lives. In one large mine in the Pittsburgh district a few years ago, for instance, an explosion in a

section of the mine not yet dusted cost the lives of many miners working there. The rock-dusted section stopped the spread of the explosion, however, and the men working in that section were unharmed.

Standard gages for coal mine tracks have been of great economic importance to the mining industry.

Another set of standards developed later, on classification of coals, represents the culmination of 10 years' work by a broadly representative committee in a field that has been studied for over 75 years. The work has been the basis for some 50 research papers and it has been estimated that the Department of Mines in Canada, the U. S. Geological Survey, and the U. S. Bureau of Mines and others cooperating spent over $100,000 on field and laboratory studies of problems directly or indirectly connected with the classification of coals. Experienced mining engineers have said that the results obtained from each of these jobs more than justify all the work done by the ASA on the entire mining standardization program.

Comparatively little headway has been made recently, however, in the development of mining standards.

Electrical Standards

From the very beginning the electrical work has bulked large in the program of the Association, growing steadily since the organization of the AESC until now there are some 80 electrical standards approved by the ASA. Through the coordinating activities of the Association, the standards of the cooperating bodies have largely been unified into a single consistent group. Also, additional standards important in the electrical field have been developed.

The general industry committee in this field is now known as the Electrical Standards Committee. It is a rather formal organization, entrusted with broad powers which grew out of a similar but less effective advisory committee organized in 1926. The more formal organization signalizes the solution of a deep-seated jurisdictional controversy, centering around the question of which of the various organizations should have the leadership in each of the technical committees. The Electrical Standards Committee, on which these organizations are now all represented, has itself taken over sponsorship for a number of the important committees, thus eliminating the problems of prestige.

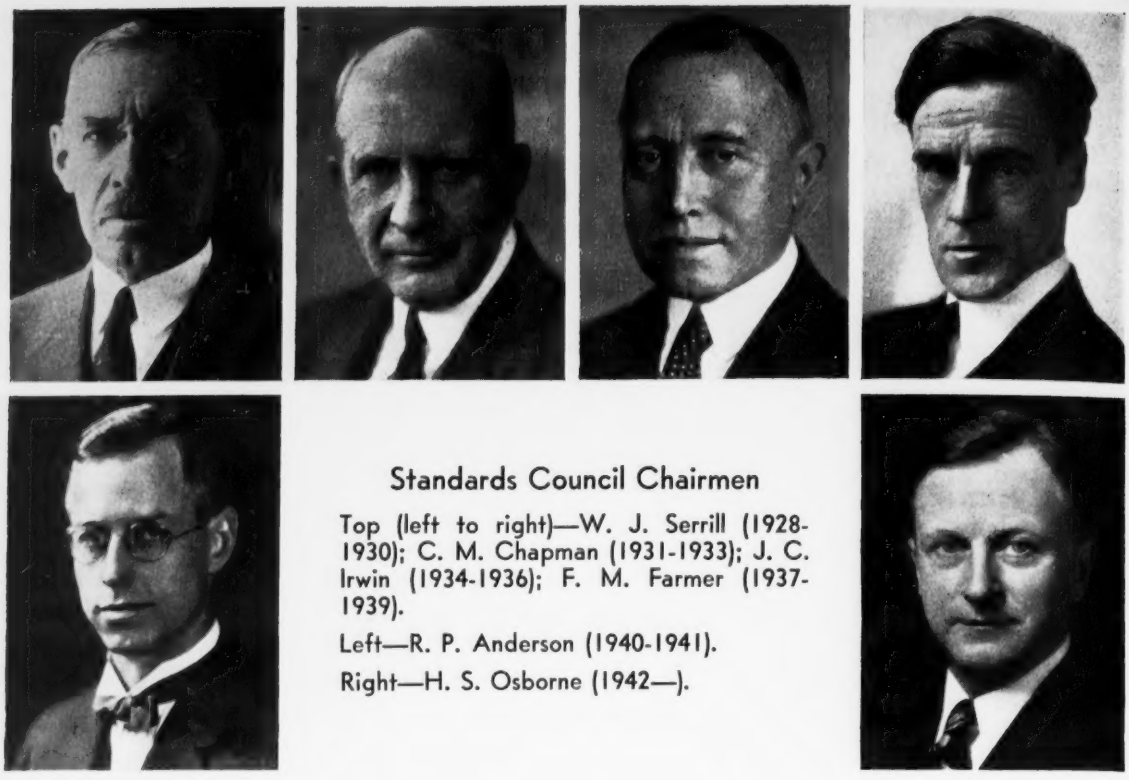
The National Electrical Safety Code was one important electrical standard around which battles raged among the interested groups for nearly a decade. Fifty accredited representatives attended the first conference. For the first time, all the interested groups were able to talk out their problems face to face. The atmosphere at moments became tense but by the end of the meeting unanimous agreement had been reached on approval of the code as an American Standard.

The organization of the Electrical Standards Committee also solved another serious problem, this time in international work. It had been found at times that the U. S. Committee of the International Electrotechnical Commission, an independent body, had international standards differing from those set up by committees working on national standards. These conflicts had led to misunderstandings in other countries, and even to the charge by Europeans that the Americans were not acting in good faith. To eliminate such conflicts, the U. S. National Committee of the International Electrotechnical Commission was reorganized so as to be identical in personnel with the Electrical Standards Committee, except for the addition of representatives of the American Society of Mechanical Engineers and a few members-at-large who have had long experience in international work.

Mechanical Standards

Organization of three new industry committees in 1935 brought about the formal departmentalization of the mechanical standards work, which had been one of the most important activities of the American Standards Association since the beginning, and expanded the Association's program into two new fields—building codes and consumer goods.

Standards for screw threads, bolts, and nuts, were among the first projects before the AESC.



Standards Council Chairmen

Top (left to right)—W. J. Serrill (1928-1930); C. M. Chapman (1931-1933); J. C. Irwin (1934-1936); F. M. Farmer (1937-1939).

Left—R. P. Anderson (1940-1941).

Right—H. S. Osborne (1942—).

The first few mechanical projects—screw threads, cylindrical fits, and bolts and nuts—were undertaken following requests from the British, Canadian, and Swiss national standardizing bodies for cooperation on these subjects. These requests were received just as the organization of the American Engineering Standards Committee was being completed.

Which Is Basic—Nut or Screw?

In these three undertakings there were two schools of thought as to what part should be considered as basic—the nut or the screw, the shaft or the hole into which it fits. This question was discussed back and forth for fully a year before general agreement was reached on the principle that the nut, or the hole, should be basic.

All industrial countries went through a long controversy as to whether the tolerances to provide for the small but unavoidable inaccuracies in dimensioning manufactured parts should be of the "unilateral" or the "bi-lateral" type. It is now generally recognized that the unilateral system should generally be used in establishing standard systems of fits, but that in some special cases bi-lateral tolerances may be preferable.

In connection with sizes of nuts and bolt heads, there was a long-drawn-out controversy. One group wanted the nuts and bolt heads to be one-sixteenth of an inch larger than that desired by the other group. This question involved the type of production machine to be used. The larger bolt head required a "two-blow" heading machine, while the smaller one required only a "one-blow" machine. The former type was the one used chiefly in the Middle West, while the "one-blow" machine was used in the East. Two companies spent $10,000 each in special research programs on these two sizes, with the result that the smaller size was shown to be sufficiently strong. This resulted in a decision in favor of the smaller size.

A curious incident in this connection illustrates the need of international cooperation in such matters. The Germans, thinking they were following American practice, established new standards using sizes shown in an American handbook in a table under the heading "national standard." As a matter of fact, these sizes were little used in this country. They discovered their error through competition in the South American market, immediately put three engineers on a boat, and cabled us requesting conferences on the subject.

There are now some 110 American Standards in the mechanical field and many more are under development. Of those completed, quite a number have become the "bible of the subject" in their respective industries. Among these are standards on screw threads, bolts, nuts, rivets, a comprehensive group on pipe flanges, fittings, and valves, and on small tools and machine tool elements.

American and British Inch Differ

It has not been generally recognized that there is a slight difference—three millionths of an inch—between the length of the American inch and the British inch under the legal definition as applied. This comes about because of differences in the legal ratios adopted in the two countries. In 1933 an American Standard was approved defining 25.4 as the inch-millimeter conversion ratio for industrial use. This same definition has also been adopted by other countries and, with the reference temperature of 20C (68F) for gages which has also been adopted internationally, has led to world-wide uniformity in conversion practice between inch and metric length measurements.

Building Codes

The building code work was brought into the American Standards Association in 1934 when arrangements

were made by the U. S. Department of Commerce and the American Standards Association for the ASA to carry on the work in this field following the discontinuing of the Building Code Committee of the U. S. Department of Commerce. The Building Code Correlating Committee is carrying on its work in close cooperation with the National Bureau of Standards. Its activities include a thoroughly rounded program covering all the essential features of modern building codes.

Building code requirements for structural steel, for masonry, and for reinforced gypsum concrete, and provisions covering the administration of building codes have already been completed. This is in addition to related standards such as fire tests of building construction and materials; basic standards for determining protection against fire; and the building exits code. Efforts are being made to expedite the building code program because of urgent requests from government and industry alike for up-to-date building codes for use in post-war construction.

Somewhat similar developments in the building code field are under way in Great Britain. An interchange of information through the British Standards Institution has been arranged so that those interested, both in Great Britain and the United States, can be kept informed of developments in the two countries.

Consumer Goods

The consumer goods program has grown slowly but steadily since the American Home Economics Association brought the first two consumer standards problems to the American Standards Association in 1929. That Association had been working on standards but had not succeeded in enlisting the cooperation of the manufacturer and distributor groups.

The question as to whether the American Standards Association should deal with consumer goods standards was a burning problem for nearly ten years, many members of the Association believing that engineering problems were not involved in standards for consumer goods and that such standards should not, therefore, be included in the ASA program. This question was the subject of conference after conference and debate after debate in the Standards Council and in the Board of Directors. The tremendous expansion of the consumer movement during and since the NRA, however, has changed the entire complexion of the problem, and has resulted in complete acceptance of the consumer goods program by the ASA.

The war has greatly increased interest in consumer standards. ASA work under its Government contracts on such items as women's work clothes, safety shoes for men and women, repair parts for civilian radio, etc., has helped strengthen its consumer goods program. In September of this year the Advisory Committee on Ultimate Consumer Goods adopted a revised and enlarged program, and added to its personnel.

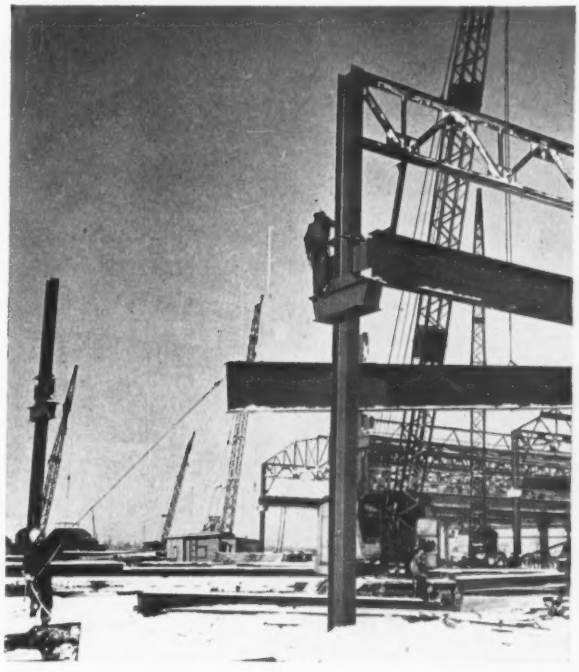
Highway Traffic Standards

The last of the general industry committees, the Highway Traffic Standards Committee, was organized to handle the many problems of standardization centering around the nation's highway and automobile accident toll. Standards on highway traffic problems developed by the ASA have already met with wide acceptance. The first job undertaken in this field was standardization of traffic light colors. The standard colors, green, amber, and red, were approved by the ASA in 1927. Since that time these colors have been accepted throughout the United States, and are becoming a world standard. The specifications for safety glass and inspection requirements for motor vehicles are among the standards that are widely used by the state governments.

War Standards

When the United States entered the war in 1941 it was natural that the organization that had grown out of the production problems of the last war should be called upon. The standards developed during the years of peace were immediately available for war production—and most of them were directly applicable.

But a great many emergency standardization jobs were needed—new standards as well as emergency modifications of existing standards. Fortunately the ASA had foreseen this, and nearly a year before Pearl Harbor had adopted an emergency procedure for developing War Standards. The first War Standard—a series of tests for accuracy of engine lathes—was approved in May, 1941. By December, 1943 the ASA had 40 completed War Standards on its books. This work included basic standards for the control of quality in production that are coming into wide use in this country and that have been adopted by Australia, Canada, and Great Britain; a Photographic Exposure Guide prepared at the request of the U.S. Navy Department and used on all military ships and planes photographically equipped; a whole series of basic standards for the component parts of Military Radio; specifications for safety shoes for men and women; work on industrial and safety clothing; and for photographic supplies and equipment. (See list of War-Time Jobs, p 348.)



Building code requirements are among the important ASA projects which will have an effect on post-war work. Requirements for structural steel have just been completed.

Conference of National Secretaries which Organized the International Standards Association, New York, 1926

Left to Right: S. E. Oesterberg, Sweden; J. Gaillard, U. S.; V. List, Czechoslovakia; E. Roth, France; C. E. Skinner, U. S.; A. Kruse, Sweden; P. Drzewiecki, Poland; C. Rodgers, Great Britain; A. Roginski, Poland; E. Uytborck, Belgium; B. Rosenbaum, Czechoslovakia; J. A. Zischievsky, Russia; Sir Richard Glazebrook, Great Britain; M. Chatelain, Russia; W. H. Tromp, Holland; Sir Archibald Denny, Great Britain; C. LeMaistre, Great Britain; S. Konishi, Japan; A. F. Enstrom, Sweden; M. Lapiroff-Scoblo, Russia; C. Hoenig, Switzerland; M. Y. Inomata, Japan; O. Kienzle, Germany; A. Huber-Ruf, Switzerland; P. G. Agnew, U. S.; L. B. Atkinson, Great Britain; A. Maier, Germany; P. Girault, France; P. Bretschneider, Austria; F. J. Schlink, U. S.; G. J. Darrieus, France; K. Heiberg, Norway.

Most of this work is being done under contract with the War Production Board and the Office of Price Administration, under which the Government reimburses the ASA for actual expenditures. The first contract, which was in the amount of $90,000, became effective in July 1942. The amount was increased to $165,000 the following year.

International Cooperation

There has been international cooperation from the first. When the AESC was being started Charles le Maistre, C.B.E., of the British Standards Institution, visited the United States and was freely consulted by those engaged in organizing the new national standardization committee. The make-up of our technical committees followed closely that used first by the British, and now by most of the national standardizing bodies. Later, the experience of Germany and the other national standardizing bodies was freely drawn upon.

It was found necessary to develop systematic interchange of technical information between the national standardizing bodies. The first steps along this line were taken in informal conferences of the national secretaries, one of which I attended in London, in 1921, and another in Zurich, in 1923. A third, more formal conference, held in New York in 1926, resulted in the organization of the International Federation of National Standardizing Associations (ISA). C. E. Skinner, chairman of the AESC, was chairman of the conference and I served as secretary.

The organization of the ISA was proposed by the British delegation, of which Sir Richard Glazebrook was leader. The British proposal, backed by the French, Japanese, Italians, and Czechoslovakians, was for a tight, closely knit organization with strong central authority. The AESC had widely consulted its Member-Bodies and industrial groups, and found that only a loosely organized international association would be acceptable in this country.

The American idea was backed by the Scandinavian countries, Germany, and Switzerland, although Switzerland later reversed her position on the subject. The result of a week's struggle over the organization plans resulted in a constitution and by-laws which followed closely the form proposed by the British, but which provided for a loosely organized international association.

Several years passed before the ASA joined the international organization, owing to controversies which arose on matters relating to it. One of the early actions of the new ASA Board of Directors was affiliation in 1930 with the ISA.

The activities of the ISA have had to be closed down for the duration and the Swiss Standards Association is acting as custodian of the records.

While general international standardization work stopped with the war, the Association has strengthened and increased its contacts with the Latin-American countries. In 1942, arangement was made for the services of an experienced field man in Latin America, with supporting staff in the central office, and with volunteer local representation in Brazil, Mexico, and Uruguay.

In December of this year a technical mission from Great Britain visited the United States to confer on the coordination of screw threads.

At the same time members of this mission laid the groundwork for setting up a United Nations Standards Committee. The function of this new international organization will be to secure the maximum possible coordination of standards necessary for the war effort and in the immediate post-war period.

Growth

The growth of the work since the reorganization in 1928 is shown graphically on the frontispiece chart. Broadly speaking, the operations have somewhat more than doubled as the result of the war work. There are

now 73 persons on the staff. The total operations require expenditures at the annual rate of $270,000. There are now 659 American Standards. There are more than 3,000 people on the various technical committees. Perhaps the most encouraging development is that the sale of standards has increased four-fold in three years—from $15,000 to $60,000. The sales of American Standards, of course, are much larger than these figures would indicate since a large part of the sale of American Standards is through the sponsor organizations.

In this quarter century the American Standards Association has made a small but significant start on the job before it—but it is only a start. We have merely scratched the surface. The opportunities still ahead of us are almost unlimited.

ASTM Announces Editorial Changes In Approved Standards

Editorial changes have been made this year in some of the ASTM standards which in earlier editions have been approved by the American Standards Association but which are under the proprietary sponsorship of the American Society for Testing Materials, the ASTM announces. The changes were made by the ASTM committees having jurisdiction over the standards, and have been approved by the American Society for Testing Materials. The standards in which these editorial changes have been made are:

Carbon- and Alloy-Steel Nuts for Bolts for High-Pressure and High-Temperature Service to 1100 F (G38.1-1942; ASTM A 194-40) Editorial revision in Section 13.

Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses (G8.7-1943; ASTM A 120-42) Editorial revision in Section 13 (*c*).

Electric-Fusion-Welded Steel Pipe (Sizes 8 In. to but not including 30 In.) (B36.9-1942; ASTM A 139-42) Editorial revision in Section 14 (*c*).

Electric-Resistance-Welded Steel Pipe (B36.5-1942; ASTM A 135-42) Editorial revision in Section 14 (*c*).

Steel for Bridges and Buildings (G24-1942; ASTM A 7-42) Editorial revision in Section 5 (*b*).

Welded and Seamless Steel Pipe (B36.1-1942; ASTM A 53-42) Editorial revision in Section 15 (*c*).

Copies of the revised standards may be obtained from the American Standards Association at 25 cents each.

National Bureau of Standards Offers Standard Steel Samples

The National Bureau of Standards announces that 18 new standard samples are now available for use as controls in the spectographic analysis of carbon and low-alloy steel. The standard samples of steel are in rod form and have been selected for checking important representative points of composition among several types of carbon and low-alloy steels. The values of the concentrations are sufficiently well distributed in most cases to provide analytical curves for Mn, Si, Cu, Ni, Cr, V, and Mo.

The standards are issued in two sizes: (1) cylindrical rod 7/32 inch diameter, 4 inches long (approximately 22 g); and (2) cylindrical rod ½ inch diameter, 2 inches long (approximately 50 g).

The standards are numbered in consecutive order in two series, the first beginning with 401 for the 7/32-inch rod and the second beginning with 801 for the ½-inch rod. They may be ordered by number from the National Bureau of Standards, Washington, D. C., at a price of $3.00 per sample, in either series, irrespective of the number of samples ordered.

Principle of Control Chart Method Is Explained in Pamphlet

"Refined Quality Control Speeds Production," by John Gaillard, originally published in INDUSTRIAL STANDARDIZATION, April and May 1943, has just been made available by the American Standards Association in a pamphlet reprint. This paper was written in an effort to explain in a simple manner the background of the American War Standards on Quality Control approved and published by the ASA in 1941 and 1942.

About 5,000 copies of the American War Standards have so far been distributed by the ASA and the Quality Control chart described in these standards is finding an increasing use in manufacturing practice. The U. S. War Department has actively promoted the use of the Control Chart method as a valuable aid in the war production effort.

Copies of the pamphlet reprint may be obtained without charge from the American Standards Association.

Foreign Trade Convention Endorses Inter-American Standards Work

In its "Final Declaration" issued as the result of action taken at the Thirtieth National Foreign Trade Convention, the National Foreign Trade Council endorsed the inter-American program of the American Standards Association. The Council stated:

"The Convention again registers its approval of an endeavor to establish throughout the Americas a comprehensive acceptance of agreed standards and specifications, as a necessary step forward in facilitating orderly commercial procedure, and closer inter-American commercial cooperations. The Convention endorses the movement of American industry to carry forward this endeavor under the auspices of the American Standards Association, and advocates support to that movement to the extent necessary to insure its continuity and effectiveness."

Milestones of the ASA

1911
- Committee of American Society of Mechanical Engineers proposes national "registration" of standards of technical and industrial groups.

1916
- American Institute of Electrical Engineers invites American Society of Mechanical Engineers, American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, and American Society for Testing Materials to join in setting up national standards agency.

1918
- Five engineering societies organize the American Engineering Standards Committee.
- British, French, Italian, and Swiss standardizing bodies invited to exchange information.

1919
- Governmental, industrial, and insurance groups added to membership.
- Mr. C. LeMaistre, secretary, British Engineering Standards Association (now British Standards Institution) visits United States; aids AESC with advice based on 20 years' experience.
- First "American Standard" approved—Pipe Thread, B2-1919 (now B2.1-1942).

1920
- Safety code program undertaken at the request of industrial and governmental groups; Safety Code Correlating Committee heads safety work.
- Mining Standardization Correlating Committee organized.
- Library of standards and information service started (now includes 20,000 standards and standardization documents).

1921
- First safety code approved — Protection of Heads and Eyes of Industrial Workers, No. 4-1921 (now Z2-1938).
- Unofficial conference of secretaries of national standardizing bodies of 7 countries held in London to encourage international cooperation on standards. AESC represented.

1922
- First standard in traffic field approved — Automobile Headlights, D2-1922 (now included in American Standard Inspection Requirements for Motor Vehicles, D7.1-1941).
- Study of preferred numbers, as adopted by industries in France and Germany, undertaken. First "standard for standardizers" issued as committee report 1927; approved as American Standard in 1936.

1923
- Second conference of secretaries of national standardizing bodies held at Zurich, Switzerland. AESC represented.
- ASA monthly magazine started (first printed copy issued in 1930; changed to illustrated news magazine, INDUSTRIAL STANDARDIZATION, in 1934).

1924
- First standard in series on screw threads approved — Screw Threads for Bolts, Machine Screws, Nuts, and Commercially Tapped Holes, B1a-1924 (now B1.1-1935).
- First Pan-American Conference on Standardization held at Lima, Peru. AESC represented.

1925
- Advisory Committee of first-line industrial executives organized.
- First building code standard approved — Safety Code for Elevators and Escalators, A17-1925 (now A17.1-1937).

1926
- International conference of 20 national standardizing bodies held in New York at invitation of AESC. Led to organization of the International Standards Association (ISA).

1927
- Electrical Advisory Committee organized (reorganized in 1931).
- Second Pan-American Conference on Standardization. AESC represented.
- Colors for Traffic Signals approved. System of red for stop, green for go, yellow for caution now becoming international.
- First machine-tool standard approved — T-Slots, Their Bolts, Nuts, Tongues, and Cutters, B5a-1927 (now B5.1-1941).
- First pipe fitting standard approved — Steel Pipe Flanges and Flanged Fittings for Maximum Pressures, B16e-1927 (now B16e-1939; B16e2-1936; and B16e5-1943).
- First nut and bolt standard approved — Wrench-Head Bolts and Nuts and Wrench Openings, B18b-1927 (now B18.2-1941).

1928
- AESC becomes American Standards Association.
- First consumer goods project started — development of specifications for refrigerators.
- First petroleum standard approved — Standard Abridged Volume Correction Table for Petroleum Oils, Z11a-1928 (now 40 standards in this field).
- Expansion of work resulting from reorganization provided for by fund of $250,000.

1929
- Symbol ASA adopted.
- International Standards Association organized. AESC joins.
- First radio standard approved — Vacuum Tube Bases, C16c1-1929 (now C16.2-1939).
- First consumer organization, American Home Economics Association, becomes Member-Body of ASA.

1930
- Work started on standards for motion picture film and apparatus (34 standards now approved).

1931
- U. S. international electrical work placed under ASA through affiliation of U. S. Committee of International Electrotechnical Commission with Electrical Standards Committee.
- Project started on Approval and Installation Requirements for Gas-Burning Appliances (35 standards approved to date).
- Policy toward certification and labeling established by Board of Directors.

1933
- Building Code work of the U. S. Department of Commerce transferred to ASA.

1934
- First pipe standard approved — Specifications for Welded and Seamless Pipe, B36.1-1934 (now B36.1-1942).

1935
- Mechanical Standards Committee organized.
- Building Code Correlating Committee organized.
- Advisory Committee on Ultimate Consumer Goods organized.
- American Standard on 16-mm Sound Film approved as international standard at ISA meeting at Torquay, England.
- First standard providing for labeling to show compliance with American Standard approved — Specifications and Methods of Test for Safety Glass, Z26.1-1935 (now Z26.1-1938).

1936
- National Advisory Committee on Toxic Dusts and Gases organized to advise on industrial health standards. Reorganized as working committee in 1938.

1937
- First distributor group joins ASA — National Retail Dry Goods Association.

1938
- Highway Traffic Standards Committee organized.

1939
- Advisory Committee of industrial executives reorganized.

1940
- ASA testimony on role of standards in eliminating trade barriers presented to Temporary National Economic Committee.
- War Standards Procedure adopted to streamline development of emergency standards.

1941
- First War Standard approved — Accuracy of Engine Lathes, B5.16-1941.
- First standards on Quality Control approved — Guide for Quality Control and Method of Analyzing Data (Z1.1-1941 and Z1.2-1941). Since adopted by Australia, Canada, and Great Britain.
- First standard setting physiological limits for toxic substances approved — Allowable Concentration of Carbon Monoxide, Z37.1-1941.

1942
- Contract signed with Government to develop War Standards for WPB and OPA.
- War work on Military Radio undertaken at request of WPB (11 standards now approved).
- Work on standards for repair parts for civilian radio started on request of OPA (4 standards now approved and made mandatory by WPB order).
- Photographic exposure guide, Z38.2.2-1942, prepared at the request of the U. S. Army and Navy. Used on all military ships and planes photographically equipped.
- Inter-American program started, with field man in Argentina.

1943
- War Committee on Photography set up at request of WPB to develop specifications for the various types of photographic and cinematographic equipment used by the Armed Forces.
- First standards to prevent pollution of public water supplies completed—Backflow Preventers for Plumbing Systems, A40.6-1943, and Air Gaps.
- First standards for footwear approved (9 American War Standards for safety shoes made mandatory for manufacture by WPB order).
- Work started on specifications for women's industrial clothing and safety clothing for both men and women, at the request of WPB and OPA.
- British Commission visits United States to confer with screw thread experts on coordination of standards.
- Participation in United Nations Standards Committee authorized.

From Our Government

The President of the United States—

There is much need for work such as the American Standards Association has been doing in the past twenty-five years. The people are looking forward to a richer, better diffused flow of abundance. Men in industry have already demonstrated their ability to utilize standards as stepping stones to progress. There should be even better opportunities to apply this ability towards advancing the people's hopes after the war.

FRANKLIN D. ROOSEVELT

The War Production Board—

I wish to congratulate the American Standards Association and to express the appreciation of the War Production Board for the work the Association has done in the war program. Applied standardization must be one of our most important means of expanding output and achieving more efficient mass production.

DONALD M. NELSON

The Office of Price Administration—

The American Standards Association has made a significant contribution to the peacetime development of American industry and is now performing important war services. I particularly wish to express my appreciation for the constructive work which the Association has been performing for the Office of Price Administration.

CHESTER BOWLES

U. S. Department of Commerce—

The quarter century since the American Standards Association was founded has been a period rich in standards development. I am sure you will agree that the primary credit for such progress, in commerce and industry, must go to the hundreds of alert private organizations which have participated. Your own Association has played an important part as a clearing house, among these private groups and between government and business. It is gratifying that throughout this period the experts of the National Bureau of Standards have collaborated effectively with those of industry, in many instances through the medium of your own clearing house.

Looking to the future, continuing success with new problems demands an eternally fresh approach. It appears that standards development may henceforth become even more important, spreading into new fields. For example, it may be that the consumer will make sellers heed his call for more and better buying facts; if so, there will be demand for standards as the basis for a new consumer buying language. For the consumer, variety itself has a deep intrinsic value unknown to the industrial buyer. Standards to foster competition both in variety and in prices will tax the ingenuity of all the experts. The old engineering skills will have to compound themselves with new commercial insight, if standards are to serve new fields of commerce in the years ahead.

JESSE H. JONES

U. S. Navy—

In the present war emergency the advantages of standardization have proven particularly valuable, not only from the standpoint of increased war production, but also as an aid in field activities. As one example of the assistance of the American Standards Association in this effort, attention might be called to the photographic exposure computer which was developed at the request of the Bureau of Aeronautics. For more than a year this computer has been standard equipment of the photographic units of the Navy in every theatre of operation.

JAMES FORRESTAL

U. S. Department of Labor—

It strikes me that your Association is especially fortunate in being able to perform services of unique value to management, to labor, and to the general public. To business interests the standardization, through codes, of materials in terms of quality, size, design, etc, has been of obvious commercial advantage. At the same time the consuming public has greatly profited by such standardization. However, my own interest in your work has been focused largely upon the series of codes for the better protection of the health and safety of our industrial workers. These safety codes—now numbering more than 60—have been the means for supplying basic information both for the development of regulatory control and have also served as bench marks for voluntary action in their application to working conditions.

FRANCES PERKINS

ANNIVERSARY MESSAGES

From Other Countries

Great Britain—

Our institution sends you every good wish for the continued success of your great work and confidently hopes that the cooperation between our two organizations will grow ever wider and more intimate.

BRITISH STANDARDS INSTITUTION

Australia—

The Council of the Standards Association of Australia extends its greeting and congratulations and expresses appreciation of many years of friendly and helpful cooperation. By special authority of Prime Minister John Curtin, this association acknowledges the invaluable contribution which American standardization has made both in peace and war to the industrial development of the Commonwealth of Australia.

STANDARDS ASSOCIATION OF AUSTRALIA

Canada—

Cordial greetings and best wishes. Record of ASA to date is one of proud achievement and a tower of strength to the cause of industrial standardization. May your success continue in the future with undiminishing acceleration.

CANADIAN ENGINEERING STANDARDS ASSOCIATION

New Zealand—

New Zealand Standards Council extends hearty congratulations. Value of your standards and associated activities, including varied and cordial assistance to all standards organizations, is occasion for reciprocal gratification. Your past achievements will provide corner stone of foundation of even greater achievements in post war period of cooperation.

NEW ZEALAND STANDARDS INSTITUTE

Russia—

We congratulate you and wish success in your further activity. We hope that collaboration between our organizations will continue to grow more as well during the war as after the victory over our common enemy.

ALL UNION COMMITTEE OF STANDARDS

Brazil—

The Associação Brasileira de Normas Técnicas fraternally congratulates ASA on occasion of Twenty-fifth Anniversary with certainty our two countries whose traditional friendship is now greatly strengthened will always work together for greater benefits from the ever increasing hemispheric standardization efforts.

ASSOCIACAO BRASILEIRA DE NORMAS TECNICAS

Uruguay—

ASA is for us the authoritative normalizing institution of a great sister Republic, which, when our own Institute was born, reached out a friendly hand and kindly offered its valuable cooperation, placing at our disposal its long experience. We appreciate in its full value this generous attitude, not only for the exceptional contribution . . . but also because it comes from citizens of a great nation with which ours feels itself intimately connected, now more than ever, in a common ideal of peace and justice. . . . In thus joining cordially in the celebration of the Anniversary of ASA, UNIT expresses its fervent desire that there may be maintained and increased as time goes on, the friendly cooperation which has been so happily initiated between both institutions.

INSTITUTO URUGUAYO DE NORMAS TECNICAS

Mexico—

Present circumstances have made it impossible to send a delegation to your meeting to express the sympathy and interest in which we hold the work which has been developed so successfully by the American Standards Association.

DIRECCION GENERAL DE NORMAS

Argentina—

I have the great pleasure of presenting my most cordial and sincere greetings and congratulations to those who have brought ASA to the level which it today occupies among the principal normalizing bodies of the world. . . . ASA's Anniversary is welcomed by all of us who directly or indirectly are associated in the effective work which it is carrying out.

INSTITUTO ARGENTINO DE RACIONALIZACION DE MATERIALES

"A Quarter Century of Service—"

Annual Report

by R. E. Zimmerman[1]

President, American Standards Association

THIS year the American Standards Association is celebrating its Twenty-fifth Anniversary—a quarter of a century of service to industry and the public. The fact that our nation is now engaged in the greatest war of all time serves to call attention to the circumstance that this Association is closely associated with war effort, generally and functionally. In 1918, near the close of the First World War, the American Institute of Electrical Engineers, recognizing the need for a national standardizing agency, took the initial step toward organizing the American Engineering Standards Committee, which later became the American Standards Association. Four other groups, the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Mining and Metallurgical Engineers, and the American Society for Testing Materials, joined them in forming and launching the new organization.

Lessons growing out of the intensive activities of the First World War had been well learned. It was clearly seen that a unity of effort, involving the widespread production of implements and goods, could not be achieved without the widespread adoption of standards, and the elimination of confusion. For peace times as well as for war it was seen that a common understanding in regard to material things would bestow inestimable benefits upon producers and consumers.

Three Standards in 1920; 657 Today

That the American Standards Association, or rather the American Engineering Standards Committee, went to work with a will, in its field, and continued its labors down to the present is indicated by the contrast of three nationally approved American Standards in 1920 with 657 today.

Initially, the concern of the Association, or its predecessor, was mainly with specifications, dimensional standards, and methods of testing in the heavy industries, but before long such matters as safety, traffic regulations, and standardization in the mining, chemical, building, rubber, and automotive fields were being handled. More recently a wide range of consumer goods has come within the scope of the Association's activities.

When the American Engineering Standards Committee was organized in 1918, administrative control rested in the hands of the five founding societies. This idea, however, was abandoned in 1920 when various industrial and governmental groups requested that the Committee inaugurate a program of national standards in the field of safety, provided it reorganize to bring in the interested trade associations, insurance and governmental groups on the same basis as the five engineering societies. This resulted in the first of a series of reorganizations, each of which widened the base of ASA representation and improved its opportunities for rendering service. In 1928 the present federated form of organization was adopted and the name was changed to the American Standards Association. Today, 77 national organizations constitute the ASA—20 technical societies, 47 trade associations, and 10 major branches of the Federal Government.

War Standards Procedure Set Up

During the past 25 years, methods of procedure have been continually improved in the light of experience, and made more flexible, the better to serve the needs of the groups using the Association. The latest significant change in these methods was the addition of a War Standards Procedure in 1941, designed to simplify the development of standards urgently needed in the production of materials for war.

On the administrative side, correlating committees, one in each major field, have been added as the work has spread to new areas. Moreover, standing committees have kept a critical eye on the record of the 600-odd standards in actual use, to guard against their becoming obsolete and thus impeding rather than fostering progress. Currently there are at work more than 3,000 committee members representing some 600 participating groups. Standards adopted or in course of adoption cut across the whole fabric of industry, covering subjects as diverse as steel girders and the shrinkage of cotton goods.

These standards, by the way, are not static—they are kept up-to-date. They are dynamic stabilizers. They have been forged into tools for every-day use, and represent the best current engineering practice.

Peace-time Work Postponed

Much of the regular peace-time work of the Association has necessarily been retarded or postponed under war conditions. We have had to concentrate intensively upon the most urgent problems. The Army and Navy have been using the ASA to a progressively greater extent throughout the war. Beginning in 1942 we undertook some special work for the War Production Board and Office of Price Administration, having to do with the development of some much desired standards. This work is covered by contract with the agencies named.

[1] Vice-president, U. S. Steel Corporation, New York.

In addition, the ASA has been active, at its own expense, on behalf of other governmental departments. The work on component parts of military radio alone is as extensive as the whole ASA program of fifteen years ago. The products of the Association's activities are being used by our Allies. For example, Australia is using our radio standards and Canada has adopted eight of them. Australia, Canada, and Great Britain have adopted the American War Standards for Quality Control.

War is an enormous consumer of goods, and is proverbially wasteful. Production for war is usually undertaken under great strain, at an accelerated pace, and with rapid expansion of capacity. It partakes of the nature of war itself, hence the much used designation, "The Home Front". In the face of a crisis, however, we had to have ships, tanks, planes, guns, and ammunition—the amount of money spent in providing them was secondary. But this we learned, that wherever component parts and methods had been standardized on a national scale, the tuning up for war production was enormously simplified. In those fields in which thoroughgoing national standards were not yet in full operation, trouble and confusion were more often encountered.

A single order for material, in the interest of speed, might be distributed among a large number of contractors and sub-contractors, each of whom would have to

ASA's Silver Anniversary Meeting

MESSAGES of congratulations from standards associations in the Allied nations as well as from agencies and departments of our Government called attention to the growing importance of industrial standards in post-war planning as well as in war production at the Twenty-fifth Anniversary Annual Meeting of the American Standards Association December 10.

President Roosevelt wired the Association: "There is much need for work such as the American Standards Association has been doing in the past 25 years. . . . Men in industry have already demonstrated their ability to utilize standards as stepping stones to progress. There should be even better opportunities to apply this ability towards advancing the people's hopes after the war." Donald Nelson, chairman of the War Production Board; Chester Bowles, Price Administrator; Jesse H. Jones, Secretary of Commerce; Frances Perkins, Secretary of Labor; and James Forrestal, Under-Secretary of the Navy, also sent messages congratulating the Association on achievements which have helped to increase production (see page 332).

Australia, Brazil, Canada, Great Britain, New Zealand, Russia, Uruguay, Mexico, and Argentina sent cables of greeting expressing appreciation for help given them by the ASA in the past and looking forward to increasing cooperation in the future (see page 333).

The machinery for closer international cooperation is now being set up, R. E. Zimmerman, ASA president, announced. Mr. Zimmerman introduced Percy Good, Director of the British Standards Institution, who has been in this country as a member of a British mission on screw threads and with whom plans for a United Nations Standards Committee have been discussed.

Mr. Zimmerman also introduced five past-presidents of the Association, all of whom had had a part in the development of the organization from a small standards coordinating committee to the present national standards association. The five past-presidents who were present at the Anniversary meeting were: Comfort A. Adams (1918-1919); C. E. Skinner (1925-1927); W. J. Serrill (1928-1930); Howard Coonley (1933-1935); and E. A. Prentis (1939-1940). Unfortunately, D. D. Barnum (1936-1938), the only other living past-president, was unable to be present.

> A United Nations Standards Committee is being organized to "spark plug" cooperation between the allied belligerent countries on standardization problems. The ASA Board of Directors has authorized the Association to participate. This announcement was one of the high-spots of the ASA's Twenty-fifth Anniversary Meeting. The object of the new international organization will be to secure the maximum possible coordination of standards needed for better production and use of material and equipment for the war effort, and in the immediate post-war period. It is planned to provide a skeleton staff with offices in London and also in either New York or Washington.

Clifton E. Mack, Director of Procurement, U. S. Treasury Department, and new member of the ASA Board of Directors, was the principal speaker at the meeting. Mr. Mack credited standardization with making possible the degree of efficiency with which Lend-Lease purchasing is carried out. (See pages 341-345 for report of Mr. Mack's address.)

Mr. Zimmerman announced the election of Henry B. Bryans, Executive Vice-President of the Philadelphia Electric Company, as president of the American Standards Association for the coming year, and of George S. Case, chairman of the Board of the Lamson and Sessions Company, as vice-president (see page 340). H. S. Osborne, chief engineer, American Telephone and Telegraph Company, was re-elected chairman of the Standards Council, and E. C. Crittenden, assistant director of the National Bureau of Standards, as vice-chairman.

Reports of the progress made during the past year were presented by Mr. Zimmerman, president, and Dr. Osborne, chairman of the Standards Council (see pages 334 and 337).

". . . wherever component parts and methods had been standardized . . ., the tuning up for war production was enormously simplified."

produce his parts so that they would fit smoothly into the final assemblies. What a blessing, in such cases, if all parties were accustomed to work to unified national standards! What a handicap without them! Unquestionably this matter of standards lies at the heart of one of the most difficult parts of the entire war effort—the coordination of production among and between plants, large and small. Many paths are made smooth when paved with recognized standards; each party knows definitely the way he must go.

When the time comes for us to reconvert the war machine to peace-time pursuits, standardization will likewise be of paramount importance. There will be pointed competition on all sides, so that survival of any enterprise must be based upon low costs, high quality, and effective service, all of which are fostered by adherence to voluntary standards. This does not mean that individual excellence will go into the discard, but it does mean that implements made, for example, with bastard screw threads, odd frequencies, unfamiliar dimensions, unproven performance, and the like, will encounter market reluctance rather than market acceptance.

Extensive Changes May Be Needed

Now there are some matters for the American Standards Association, on its part, to consider. The time is not far away when our whole program—war work, pre-war activities, and post-war needs, will have to be reviewed with all the parties interested. We hope that this will include a review of all American Standards. That extensive changes in the program may be called for is indicated by the fact that our sale of standards in the past two years has been increased fourfold.

Then there is the matter of standards for consumer goods, in which public interest is increasing at a rapid rate. In response to this interest, a representative section of business is working with the problems of setting up trade standards as a useful technique in the conduct of merchandising. Our correlating committee on consumer goods has already agreed upon the general lines of a program for post-war development. This subject will require careful attention on the part of the American Standards Association.

New Phase in International Work

Another item of outstanding significance is international standardization—not a new subject with the American Standards Association, for we became identified with the movement twenty years ago. Post-war activities in that field, however, will have to be on an entirely different scale than hitherto, and the alignment of world powers may be such that our course of action will be through altered and reconstructed channels. The cooperative movement initiated by ASA with the other American republics will demand enlargement, hard work, and adequate financing if it is to attain its very desirable objectives. And what of China, undoubtedly heading toward elaborate industrialization, will she pattern her methods, equipment, and standards after those of the United States, or follow systems foreign to ours? This is a question of profound importance to American industry because the answer will have a telling effect upon international trade. The Chinese Ministry of Economics, which is making a study of the subject, has sought information and advice from the American Standards Association, and we must be in a position to cultivate intensively all opportunities for helpful guidance.

Other evidences of the importance of international cooperation are appearing. A British mission was recently in this country in connection with an extensive program of research and standardization for buildings. The mission arranged with the ASA for systematic exchanges between the respective committees on the subject. Similarly a British mission on screw threads has just finished a series of conferences in which the ASA took an active part.

With reference to all of the foregoing, one might appropriately say that as the commercial horizon widens, the need for standards and standardization widens with it. Therefore it is highly improbable that

the American Standards Association, because of a lack of need for the services it can render, will ever work itself out of a job.

The final point we should like to make in discussing the American Standards Association with you is that we must strive, by the exercise of fairness, diligence, and efficiency, to preserve the voluntary method of arriving at standards, which is the heart of our procedure. The common meeting ground which is here provided, the engineering approach, and the will to give issue to those stipulations which will work to the best interest of all parties concerned, provide a rational and democratic way of adopting standards. Independent of political influence and free of governmental edict, the procedure places reliance upon the shoulders of experts, whose integrated decision is guided by the best experience obtainable. The American Standards Association is the creature of our American system of free enterprise, and there is no logical substitute for it. We face immense possibilities for continued service in the future—service to industry, to the consuming public, and to the nation. These possibilities are matched only by the responsibilities which they entail. Knowing the mettle of this organization as it has developed during the first twenty-five years of its existence, I look forward with confidence to the outstanding role the American Standards Association will play in the next quarter-century.

Events of the Year

Annual Report

by Dr. H. S. Osborne[1]

Chairman, ASA Standards Council

THIS has been a year of great accomplishment. The American Standards Association is now fully on a war basis. The high level of activity is illustrated by the fact that, compared with five engineers on the staff two years ago, there are now 14. The number of standards approved during the year—119—is high but not record-breaking. It includes, however, more new standards (93) than have been approved in any other year as contrasted with revisions.

Three-quarters of all the standards approved during the year are believed to be of direct value to the war effort. A third of these were developed under the War Emergency Procedure of the Association and the other two-thirds are permanent standards developed under our regular procedure—the result of turning our efforts to the work most immediately important. The other 25 percent of the standards approved will be of immediate importance in connection with post-war activities.

In making an analysis of the standards, they can be grouped in many ways, and in fact many standards would fit more than one classification in any grouping which could be established. However, the following indication of the major purpose of the standards is of interest:

War production	41
Safety of workers	23
For use by the armed forces	21
Important for post-war production	26
Essential civilian services	5
Scientific and general	3
Total	119

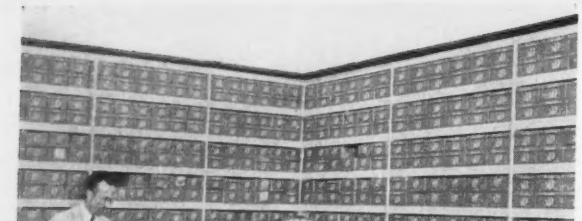
[1] Chief Engineer, American Telephone and Telegraph Company, New York, N. Y.

The standards approved during the year include a number which are of particular interest. Important work has been done in reducing the number of items to be manufactured and improving the interchangeability of parts in materials for the armed forces. Outstanding in this field is the work of the Radio Committee started in 1942. During this year seven standards have been approved and placed in use covering various types of insulators, insulating material, and resistors. The work on this subject is now in full blast and 14 additional standards are under way.

A similar type of standard approved this year is the standard for electrical indicating instruments covering 2½-in. and 3½-in. round, flush-mounting, panel-type instruments which are standard equipment for many uses by the armed forces.

First National Standards for Clothing

Another interesting group of standards relates to clothing for workers. Nine standards for safety shoes for both men and women have been approved which will save valuable war materials and protect the workers against injury which might keep them from their jobs at a time when their services are vital to production schedules. These standards include safety-toe shoes to protect the workers from falling objects, conductive shoes to protect the workers in operations where the accumulation of static electricity on the body of the worker is likely to cause an explosion, non-sparking shoes to provide protection for operations in which sparking caused by shoes on hard floors is a hazard, electrical hazards shoes to minimize the hazards due to contacts with electrical current, and foundry shoes to protect the foot against the hazards resulting from



Safety shoe standards for men and women in industry were completed in 1943.

the handling of molten metal. Another group of standards, now out in draft form for comment, provides standards for women's industrial clothing designed to eliminate safety hazards and to be comfortable and efficient for the particular jobs involved.

The work on safety standards has been particularly important this year because of the rise of accidents in war industries. One standard of this type is a revision of the Abrasive Wheel Safety Code, which is so widely used that it has been called the bible of the industry. The revision includes new rules to take care of new types of abrasive wheels and new applications since the last revision in 1935.

The Committee on Toxic Dusts and Gases has completed seven standards this year. These standards set safe limits on the presence of toxic gases, fumes, and dusts in workroom air, protecting the worker from arsenic poisoning, lead poisoning, and so on.

The ASA has also completed a new Safety Code for Cranes, Derricks and Hoists. The purpose of this standard is to protect workers engaged in hazardous hoisting operations.

One interesting publication is a specification for applying shock tests to electrical instruments. It provides standard methods for testing electrical indicating instruments under conditions intended to simulate combat field conditions. Such tests are needed by the armed services for delicate electrical indicating instruments used in tanks and planes to insure that they will remain in service and give accurate results under the very severe conditions of combat.

Photography Work Active

A large amount of work has been done during the year by the committee on photographic standards. This has included the adoption of a whole range of standards, standardizing sizes of roll film and spools to produce the interchangeability required by the armed forces. The work also included standards of rating of photographic speed and speed number for use in connection with the emergency photographic exposure guide developed last year at the request of the armed forces. Recently the War Production Board asked that specifications be developed for the various types of photographic and cinematographic equipment to be used by the armed forces. The committee is already at work on this project.

Need for International Coordination

A growing need has been developing for coordinating British and American standards which are used by war production agencies in the two countries. As a result this has led, after considerable correspondence, to a recent visit to this country of a mission from Great Britain to consult on the standardization of screw threads. Mr. Percy Good, Director of the British Standards Institution, who accompanied this mission, proposed the desirability of establishing some continuing agency for handling standardization problems of this sort between the Allied Nations. As a result of extensive discussions, a draft proposal has been made for a temporary organization to be called the United Nations Standards Committee, with a small staff in London and in New York, devoting their time to the coordination of standards between the Allied Nations as may be necessary for the war effort and the immediate postwar period. The Board of Directors of the Association has approved this plan in principle. It is expected to be placed in operation in the very near future after consultation with various of the Allied Nations most directly concerned.

Looking Ahead

During the coming year, as during the past year, our first effort must continue to be directed to doing those things of immediate importance in advancing war activities. Nevertheless, it is natural and proper that we should begin to look ahead. Already a part of the work of the American Standards Association's committees is directed toward the completion of standards principally because of their importance in post-war industry both from the standpoint of the producer and the consumer.

One interesting and important standardization problem of the post-war world will be the position of international standardization.

Prior to the war, effective standardization work, particularly in the electrical field, had been carried on for many years by the International Electrotechnical Commission. Some standardizing work in the field of illumination had been carried on by the International Congress on Illumination. In recent years additional work, principally in the mechanical field, had been carried on by the International Standards Association. All of this work was perforce placed on ice for the duration of the war. The work to be carried on by the proposed United Nations Standards Committee will not, of course, be generally international in character but limited to immediate problems of some of the Allied Nations.

While all those who are familiar with the work of the past, I believe, are appreciative of the work which has been done, having in mind the inherent difficulties of international standardization, I think we have felt generally that the international standardizing organiza-

tions of the past have lacked sufficient support fully to meet the opportunities and responsibilities which were developing in this field. After the war it is to be hoped that international trade will be stimulated and that the scope and value of technical standards which are accepted internationally will correspondingly increase. Certainly, for goods which are shipped across international boundaries there is advantage in having at least international agreement on the terminology which describes such goods and their essential characteristics and on the methods of testing and measurement by which such characteristics are determined. This possibility, the bare minimum of an effective system of international standards, is in itself a very large field and to this minimum could be added other large fields of standardization in which international agreement would have advantages.

Foresee Enlarged International Organization

Looking ahead to the adequate handling of an increased program of international standardization work, one can envisage the possibility of an enlarged central international standardizing organization with the work organized into general divisions similar to those represented by the Correlating Committees of our Association. Preferably, such a central organization would serve to affiliate organizations working in specific fields; for example, the IEC might become its Electrical Division. Corresponding divisions could be created to serve in other fields not already covered.

Our ability and that of other countries to take their part in such an enlarged international standardizing effort naturally will depend upon the continued increase in the recognition here of the importance of the work which the ASA is doing and of the corresponding increase in the financial support necessary for the expanding scope of its work.

There is one other aspect of looking ahead which I should like to discuss briefly bearing on our internal organization. This is the position of the Standards Council in the work of the American Standards Association.

Changes Needed in Standards Council?

In the early days the Standards Council was the only general organization of the AESC and it was overburdened with work. This situation has been greatly changed by two developments. On the one hand a Board of Directors has been established and that board has been assigned all of the policy-making and financial and organizational questions which naturally are handled by such a body. On the other hand, the Standards Council has organized a series of correlating committees and to them has transferred much of the work relating to the organization of sectional committees, the undertaking of projects, and the approval of standards formerly carried out by the Council itself.

Both of these steps were good and we believe they represent proper organization. Taken together, they have so greatly relieved the Standards Council that during the past two years we have found two short meetings a year to be adequate and, in fact, the amount of work required to be done at these two meetings has been relatively slight.

In view of this trend one possible policy might be gradually to eliminate the Standards Council altogether by transferring all its remaining functions to the Board of Directors on one hand and to the correlating committees on the other. I believe, however, that such a step should not be taken without serious consideration.

The Standards Council is made up of representatives appointed by all the Member Bodies of the ASA and it is the only body so constituted. In a sense, therefore, the Council might be considered to represent the constitutent bodies of the organization more broadly than the Board of Directors. The Council appears to be uniquely the proper body for the consideration and expression of the desires of the Member Bodies on questions of a general character.

At the present time I am raising this question without proposing an answer. I believe, however, it deserves the careful consideration of all members of the Council and of the Board and hope that at a later meeting we may further discuss this problem and reach a conclusion as to what the future course of action of the Association should be.

Conclusion

The war has in many ways given a great impetus to the standardization movement by increasing the appreciation of the importance of standards. A few months ago when the scarcity of critical materials was at its height the War Production Board issued a statement crediting the establishment of standards with having saved 60,000 tons of steel and 17,000 tons of copper. The relation of this Association to the war effort has steadily become closer.

Standardization will be equally important after the war and perhaps more important even than it was before the war. Economic experts look forward to a period of big production, and the re-establishment of friendly relations and good conditions throughout the world will involve a large amount of international trade. I believe it a proper conclusion that the need for standardization work, both national and interna-

Simplification and standardization of panel-type instruments has aided production of radio and electronic equipment for the armed forces.

tional, will continue to increase and that the activities of this Association should continue to expand if we are to fully meet our responsibilities.

On the other hand, times will probably be difficult for standardizers as well as for people dealing with other phases of industrial processes and international relations. On this view we look forward to a period of not only increasing responsibility but of hard work and of great difficulties to be overcome. That should be a continuing challenge to all of us who are working in the various parts of the ASA organization and one which I know will be met.

H. B. Bryans

George S. Case

H. S. Osborne

E. C. Crittenden

ASA Officers for 1944

H. B. BRYANS, executive vice-president and director of the Philadelphia Electric Company, is the newly elected president of the American Standards Association for the year 1944; and George S. Case, chairman of the Board of the Lamson and Sessions Company, is ASA vice-president. H. S. Osborne, chairman, and E. C. Crittenden, vice-chairman of the ASA Standards Council will both remain in office.

Mr. Bryans has been a member of the ASA Board of Directors since 1941 when he was nominated by the Electric Light and Power Group. He was vice-president of the American Standards Association in 1942. During his entire business career he has been employed in the public utility field, starting as mechanical engineer with the United Gas Improvement Company in 1907. He became assistant general manager of the Philadelphia Electric Company in 1928, vice-president in charge of operations in 1929, and has been executive vice-president since 1938. He is also executive vice-president and director of the Deepwater Light and Power Company, the Electric Realty Corporation, Philadelphia Electric Power Company, Philadelphia Hydro-Electric Company, Philadelphia Steam Company, Susquehanna Electric Company, Susquehanna Power Company, and Susquehanna Utilities Company. Mr. Bryans is a member of the Board of Engineering Education, University of Pennsylvania. He is a member of the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, the Franklin Institute, the Electrical Association of Philadelphia, and the Historical Society of Pennsylvania.

Mr. Case, who has served as vice-president of the American Standards Association since January 1943, has been a member of the ASA Board of Directors since 1939. He was nominated by the American Institute of Bolt, Nut and Rivet Manufacturers. He has also been active in the technical work of the Association as an alternate member of the ASA Standards Council, and as a member of several sectional committees.

Dr. Osborne, re-elected chairman of the Standards Council, has been a member of the Council since 1923, representing the American Institute of Electrical Engineers. He served as vice-chairman of the Council from 1940 through 1941, and was elected chairman at the Annual Meeting in December, 1941. Dr. Osborne, who has been with the Bell system since 1910, is chief engineer of the American Telephone and Telegraph Company. Dr. Osborne is the author of many technical articles on communications engineering. He has been an alternate member of the Electrical Standards Committee and of the U. S. National Committee of the International Electrotechnical Commission since 1931.

E. C. Crittenden, vice-chairman of the Standards Council, is assistant director of the National Bureau of Standards and chief of the Electrical Section. He has been a member of the Standards Council since 1925 (when it was the Main Committee of the American Engineering Standards Committee), and has been active in the work of the Electrical Standards Committee since its organization in 1931. He has been president of the United States National Committee of the International Electrotechnical Commission since 1939. He is a member of eight sectional committees working on electrical standards problems. Mr. Crittenden has been with the National Bureau of Standards since 1909, was appointed chief of the Electrical Division in 1921, and assistant director in 1933.

Standards Aid Efficiency In Federal Procurement

by Clifton E. Mack

Director of Procurement, U. S. Treasury Department

ON the morning of November 30, last, there was placed upon my desk in the Procurement Division of the United States Treasury Department, at Washington, a single sheet of white paper of letterhead size. This paper carried merely 12 lines of typewritten figures. The figures constituted a financial abstract that covered Lend-Lease operations since their beginning on March 11, 1941. . . .

It would be a satisfaction to me were I in a position to reveal the progress that has been made by citing these very newest records. I regret that this is not possible. The figures stand for operations which from a military point of view are so recent that they must be held secret. Nevertheless, I may direct your attention to certain reports which have been released, and which deal with activities through July 31, 1943.

Thirteen Billions of Dollars

Almost thirteen billions of dollars worth of supplies, equipment, and services were placed at the disposal of our allies up to and including this date. This aggregate includes two and one-half billions of dollars worth of those things which the Lend-Lease program describes as "industrial items."

The purchase of industrial items, in the Lend-Lease program, is virtually the responsibility of the Treasury Procurement Division. The term includes machinery, metals, lumber, and chemicals as its principal components. But in addition, it covers thousands upon thousands of miscellaneous things that are in daily use in every section of the world, in both wartime and during peace. In short, you may regard the Procurement Division as being under assignment to provide for our allies just about every commodity that is known to civilization, aside from instruments of strictly tactical or combat nature. . . . .

The combat materials and devices of the Lend-Lease activity as differentiated from industrial and civilian items are procured by the tactical services of the United States. The U. S. Navy, for example, provides such things as submarine torpedoes. Tanks and motorized artillery are supplied by the U. S. Army. The U. S. Department of Agriculture provides all Lend-Lease foods. Merchant ships and repairs, when supplied as Lend-Lease aid, are the responsibility of the U. S. Martime Commission.

These are the broad categories in the long list of things that comprise Lend-Lease. . . .

May I now recall the slip of paper carrying that financial abstract which I mentioned at the beginning. There was contained within it one figure which cannot be regarded as of military value to our opponents.

Earns Cash Discounts

That figure reports a sum of money which was earned by the Procurement Division through cash discounts allowed for prompt payment of our Lend-Lease invoices. It covers such earnings from March 11, 1941, until November 29, 1943. That sum of money is $9,915,982.35!

. . . . You are familiar with the fact that often the cash discounts are at a rate as low as a quarter of one percent. And you will quickly realize that discounts accumulated in a total as high as 10 millions must have been applied to invoices aggregating a sum measurable only in billions. . . . .

Many of our invoices require payment within 10 days to qualify for discount. In your establishments, as in the public offices, it has been found necessary to pass a single invoice through many hands before it can be paid properly and with due regard for accuracy, evidence of acceptable delivery having been established. In both places, it is imperative that an instrument calling for disbursement of funds must be verified with many branches of the organization, such as purchasing, testing, inspection, transportation, and the like, before it can be certified by the finance branch for issuance of a check by the disbursing authority.

Peacetime Practices Revised

In order to take advantage of these short-term discount offers, it became necessary, at the beginning of Lend-Lease operations, to revise our peacetime normal practices to provide for plant inspection and acceptance of goods at point of manufacture rather than examination upon delivery to the user as heretofore.

Under this new and expedited financial procedure, we have processed 553,898 individual invoices within the period during which we accumulated the large discount total that I have reported.

The amount earned in discounts exceeded by approximately $1,300,000 the entire administrative cost for all of our own Lend-Lease operations. Need I add that in the Procurement Division we think this record indicates a serious effort so that our stewardship of public business shall be efficient.

Abstracted from address presented at ASA Annual Meeting, December 10, 1943.

Efficient operation is the direct result of the application of the principles of standardization.

The principle of standard practice and technique is recognized and applied in almost every activity of our Procurement Division—and the number and variety of these activities is multifold.

Lacking a standard method, we never could have processed, with the promptness necessary to earn our discounts, that enormous volume of more than one-half of a million Lend-Lease invoices.

We classify our sources of supply so that when we undertake a procurement our approach may be abbreviated through a standard method. We execute the purchase order on a form that has been standardized. We test by a standardized practice the item which has been purchased. The item is packaged for export shipment according to a standard intended to insure that it will reach the user in serviceable condition. Its transportation is arranged in advance of consignment on the basis of a technique devised to move the shipment quickly over that route which is quickest and cheapest. During transit, the package lends itself to expeditious handling by transport personnel because of a system of standard marks and labels. And finally, standard practice ushers the contractor's invoice through our financial division so that not only may the vendor enjoy a prompt and welcome settlement, but so that the taxpayer, likewise, will receive a dividend in the form of reduced public expenditure.

Repetitious Processes Standardized

Standardization involves a principle which is employed most suitably and profitably when it may be applied to a practice or process that is repetitious. In our activities in the Procurement Division, repetitious processes are encountered on every hand. For one thing, this is a condition that results from the vast quantities in which we buy. When we receive an assignment to purchase lumber or steel, for example, the quantity is most often measurable in a number of units that will fill a whole freight train or an entire merchant ship.

We may need to acquire plumbing equipment of the kind used in small homes for war workers in the large quantity represented by the sum of $15,000,000. We recently purchased 11,000,000 yards of cotton cloth as a single operation. Again, we were asked to provide 250,000 teakettles on the same day when there came a request for 1,350,000 pounds of electrolytic zinc.

There is another circumstance that tends to induce repetition in our activities, and the resulting need for standardization of method. This is the fact that our personnel extends throughout the country. Although our central administrative office is in Washington, we have representatives and their assistants in 11 regional centers spread throughout the continental United States. The activities of 5,000 persons working on the same program must be coordinated by standard methods that will cover every operation from purchasing and inspection to final delivery.

Storage Must Be Provided

We not only purchase, inspect, ship, and deliver, but we also store. Some storage is temporary, such as that of Lend-Lease supplies, which at times must be halted in transit from the factory to avoid congestion at dockside while convoys are assembling. Other storage is for custody of supplies regularly needed by the Government's many departments and agencies. The purchase and stocking and issue, as required, of those supplies and equipment in common use is one of our many regular peacetime responsibilities as the central procurement agency of the Federal Government. All this requires a system of warehousing facilities, some merely temporary and others of a permanent nature.

Eleven Storage Regions

To operate these storage facilities, each of our 11 regions has been established to coincide with the natural incidence of procurement, inspection, also storage and issue, as they occur in the respective territories. For example, our San Francisco warehouse deals particularly with the needs of the U. S. Forest Service which is now unusually active in the timbered sections of the Northwest. Other agencies also make use of this warehouse in connection with their activities on the Pacific Coast.

Our Washington warehouse stocks upwards of 1,800 items and must handle an inventory which, although constantly changing, nevertheless is continually maintained at a value close to the revolving fund of $5,000,000 that has been set up to support this establishment. From this warehouse certain supplies are drawn by all Government offices in Washington. Offices in other sections of the country also obtain their requirements from Procurement storage centers.

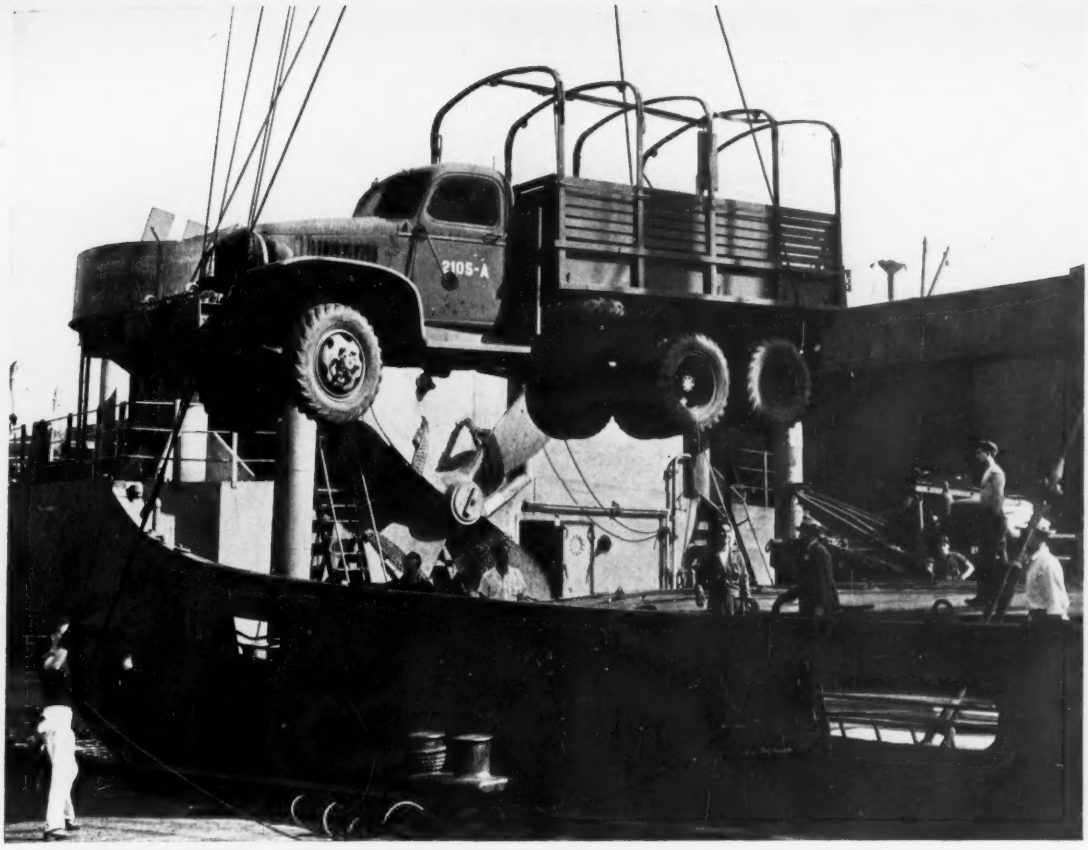
All of our regional warehouses for stock-issue to Federal agencies carry a certain volume of general supplies. In this respect their inventories have a degree of similarity. But because specialized demand for goods occurs in many of the regions, it follows that some warehouses must store commodities that are not common to all sections. It is clear, therefore, that standardized methods must be employed in the central control and direction of these regions.

Federal Standard Stock Catalog Helps

Classification and uniformity of policies with respect to the storage and issue is made possible through the Federal Standard Stock Catalog. Almost 1,000,000 items are listed, and the catalog is one of the major responsibilities of the Procurement Division. Compilation was begun in 1929 and the Catalog now covers almost every item which might be expected to be of any conceivable use to the Federal Government. Each listed item carries a code number and it is thus precisely identified for the information and convenience of every officer and employee of the entire Federal personnel.

A continuous effort further to standardize warehousing methods is put forth by the Procurement Division. Under a special program, a survey was made recently to systematize storage and issue in such fashion that the number of storage sites could be consolidated and reduced. With uniform nomenclature, and uniform methods of storage and issue made possible through improvement of the Federal Catalog, it has been found that much duplication could be eliminated in warehouse practice.

The use of a central system of commodity classification is now being extended. For one thing, our war experience has indicated its desirability. For another, the end of the war will confront the Government with



A truck being loaded for delivery on a lease-lend contract.

the problem of disposing of a large volume of surplus property without interfering with the nation's economy, and with a minimum of sacrifice of the Government's enormous investment. Here is a matter in which a standardized technique is imperative.

The activity in which the Procurement Division touches the principle of standard practice most directly is perhaps that involving commodity specification and the tests which must be employed to insure that the items supplied shall conform to the standard so established. There is also the additional important activity of determining standards for inspections and tests, as well as packing and packaging.

One of the most difficult problems of Lend-Lease has been, and still is, that of making certain that the supply procured shall reach the user in serviceable condition. Lend-Lease supplies go into every far corner of the globe. Ocean transport subjects equipment to hazards of all sorts of weather, violent temperature changes, and innumerable variations of rough handling.

Relatively few American manufacturers were required, during peace periods, to pack for export at the factory. Exporting establishments assumed this responsibility. In wartime, when almost every factory in the country is producing directly for export, it is a dismaying task indeed to disseminate throughout all American industry the information and instructions necessary to insure safe packaging. But that task is being performed.

We now have standard specifications for both packing and packaging. To the war-harried factory manager, these specifications often seem like what he calls "folde-rol." We concede the point, but we insist, nevertheless, that the specifications shall be followed. The result is good. Broken and spoiled deliveries are relatively few. Otherwise, the pressure on our enemies would be weak instead of strong.

The population of England, I may point out, is now eating butter churned in New Zealand and shipped half way around the world. Although it passes from the heat of the tropics into the temperate zone, that butter reaches its destination still sweet and still edible, despite weeks in transit. During the journey, the containers in which that butter moves probably are sloshed with sea water almost daily. It is not impossible that at times some of the containers may have been completely submerged in salt water.

Those containers were manufactured in the United States at the order of the Procurement Division under Lend-Lease requisition. They were made of paperboard instead of metal. And to make the paperboard boxes tight, it was necessary to seal them with a special pressure tape that had to be impervious to moisture.

Specifications Control Manufacture

Specifications controlled the manufacture of those butter containers to insure that they would have properties of resistance necessary to meet successfully the transportation hazards that were anticipated. Those containers had to be exactly right on the first try at production. The needs of the user were known exactly. The advance plan for their manufacture had to be as near conformance with the requirements as could be

Clifton E. Mack

Clifton E. Mack, director of procurement of the U. S. Treasury Department, has been elected as a member of the Board of Directors of the American Standards Association. Mr. Mack will serve the unexpired term of Dr. Pauline Beery Mack who was nominated by the American Home Economics Association, and resigned when that Association became an Associate Member of the American Standards Association instead of a Member-Body. Mr. Mack was nominated by the U. S. Treasury Department. His term of office expires December 1944.

Mr. Mack is in charge of all Government lend-lease purchasing, as well as having charge of all purchases of standard supplies and equipment for all the Government departments. The work on Federal Specifications heads up under Mr. Mack. He reports that he is planning a revision of the methods followed in developing these Specifications, which will include a much closer tie-in with industry through the American Standards Association and its Member-Bodies.

achieved. There was no room for mistake—for what, in peacetime, industry calls "bugs" in manufacture. The population of England required that relatively small amount of butterfat which they could bring halfway around the world as a war need, not instead of, but along with, guns.

Follow Standard Engineering Practice

Standard engineering practice was drawn upon to write the specifications for those butter containers. Perhaps some of the standards employed in devising those specifications were American Standards issued by this Association. But whether or not that actually was the case is beside the point. Standard practice was an essential gauge by which to translate the requirements for the containers into the terms of their production and their resulting properties.

The acquisition of commodities and of services by the Procurement Division for Lend-Lease and for other departments and agencies of the Government in war and peace is continuously referred to standardized practice through use of commodity specifications. These establish standards of quality and performance as essential requirements. This is the basis for the proper evaluation of competitive products qualifying for the same specification.

The standardization of commodity specifications for interdepartmental use began in the Federal Government soon after the close of World War I. The responsibility of carrying forward this task passed through several committees and agencies of the Government and finally came to be centralized in the Procurement Division.

As Director of Procurement, it is my duty to promulgate these standards under the title of Federal Specifications. Federal Specifications are mandatory upon all departments and agencies of the Government. Deviations are permitted only upon justification, and even in such cases all applicable provisions of the specifications must be followed. There are, at present, approximately 1,600 Federal Specifications.

When war made some materials scarce, it was found that many Federal Specifications could not be met by suppliers. That indicated the necessity of revisions which would eliminate materials that were not only scarce, but also those that were critical to the nation's strategy, and hence must be reserved for exclusive use for direct war needs. Specifications thus revised are known as Emergency Alternate Federal Specifications. Of these, approximately 400 have been devised in collaboration with the Conservation Division of the War Production Board, and promptly promulgated.

The method by which Federal Specifications are prepared is similar to that employed by the American Standards Association. Like the American Standard, the Federal Specification is designed as a consensus, a unification upon which all of those directly concerned may reach approximate agreement.

72 Technical Committees

In each case, the task of formulation begins with a technical committee. Seventy-two technical committees deal with the work of the Federal Specifications. All departments and agencies of the Federal Government which may be interested collaborate on these committees. Also brought into collaboration are representatives of trades and industries, including both engineering and their management personnel. It is intended to bring into conformity the requirements of the user of the item and the productive capabilities of industry which must produce the item in terms of the most acceptable commercial practice.

Being a result, then, of collaboration between Government and private enterprise, the Federal Specification is designed to contain a benefit for each. The Governmental user enjoys a product which, because it fits his requirement, provides maximum serviceability in relation to the price paid. For private enterprise, standardization by the Government tends to encourage multiple output, or to increase it in the case of those items already being created under that process. Multiple, or mass production reduces manufacturing costs, and this leads to more profitable private operation. Furthermore, the direct transaction of business between Government and private enterprise is mutually beneficial.

Material Benefit to Consumer

A widespread study of industrial standards grew out of World War I. In that conflict, the demand for equipment and supplies was enormous for the period. That demand was suggested by the success which manufacturing industry, particularly that in the United States, had previously achieved in the creation of identical units in mass quantities. This achievement was a result of standardized practice in factory operations. But it was merely a beginning, as we were to learn in the next 25 years.

With the close of World War I, it was seen that much of the experience gained by industry could be carried over into a normal economy. Establishment of the American Standards Association at that time symbolized a general recognition of the value of the principle of industrial standards. Since then, there has been developed a kind of science of standardization with a literature of its own.

Practical application of this lore by industry resulted in the flood of goods and services throughout the entire world and especially in the United States. Materially, the benefit to the consumer was like nothing ever before even imagined.

Then came the opening of World War II to seize upon this industrial accomplishment to make war correspondingly horrible. That is not, however, the fault of industry, nor does it detract from the value of the principle of standardization.

The principle becomes, in truth, an antidote to its own poison. Without standardization, the United Nations could not even anticipate the overthrow of our opponents. The United States could not have unified its entire industrial plant into what amounts to one single assembly line that operates in effective coordination from the Atlantic to the Pacific. It would be impossible to draw from almost every one of the 48 states the components of a giant air bomber and to assemble them under one roof into a unit to destroy our enemies. Nor could a bridge-building concern in Philadelphia, let us say, put together the bow of an Army Landing Ship that could travel on a flatcar to Pittsburgh, there to be joined to the remainder of a hull, and then floated down the rivers to tidewater and begin a journey to the Mediterranean with a battalion of soldiers. These productive miracles are accomplished only because of attention to what Mr. Howard Coonley has described as "tremendous trifles," such as unification of the microscopic distance between threads of a screw.

New Techniques for Post-War Industry

The termination of World War II will release to a world of peace new industrial techniques which we have lately been forced to squander in wasteful conflict. From these practices, all expect new things and better things. This you might describe as the cycle in the evolution of the principle of standards. We have come to regard that principle as the foundation of industrial civilization. The advantages of these principles, which have their roots in warfare, may be developed most advantageously for peaceful economy by activities like those of the American Standards Association. As the custodian of a principle, this Association must make our trifles actually become tremendous.

New Book on Techniques For Industrial Safety

Industrial Safety, edited by R. P. Blake, gives a broad picture of the fundamentals of industrial accident prevention. Its primary purpose is the instruction of those who are interested in the fundamentals and broad overall aspects of industrial safety but it can also serve as a reference work for safety engineers. It is helpful as a reference both for its review of long established fundamentals and because of its up-to-date information on the application of these fundamentals in the various subjects covered.

The book explains the importance of safety and its close relation to other production and personnel problems. One chapter describes the procedures of the American Standards Association and the role of American Safety Standards in the field of accident prevention.

The 31 chapters were prepared by eight authors who have had many years of practical experience in the prevention of industrial injuries. In this book they present the combined viewpoints of safety engineers in a variety of types of organizations—including a single large plant, the widespread organization of a Public Utility System, a large casualty insurance company which covers both large and small plants in all branches of industry and in all parts of the country, and a Governmental department concerned with the development of mandatory regulations as well as the distribution of educational material.

At the time the first Engineering, Science, and Management War Training Courses in safety engineering were started in January 1941, there were so few textbooks available that arrangements were made to reproduce copies of the first edition of *Industrial Accident Prevention* by H. W. Heinrich for the use of these classes. This edition had been published in 1931. Within the year a second edition of this book, including the advances of the past ten years was published, and this edition has been used by subsequent classes. Now Mr. Blake's book will provide a welcome addition to this specialized field of technical information.

—Henry G. Lamb, Safety Engineer, American Standards Association.

Standards Issued by Associations and Government

(See "ASA Standards Activities", page 366, for new American Standards and progress on ASA projects)

For the information of ASA Members, the American Standards Association gives here a list of the standards received during the past month by the ASA Library for its classified files. With the increasing amount of material being received it has been decided to eliminate from the monthly list a few of those standards which may not be so important to ASA Members, such as Federal Specifications for foods. The list below, therefore, includes only those standards which the American Standards Association believes will be of greatest interest to Members in connection with their war production.

The standards listed may be consulted by ASA Members at the ASA Library, or copies may be obtained from the organization issuing the standard. Addresses of these organizations are given for your convenience.

Associations and Technical Societies

American Iron and Seel Institute (350 Fifth Avenue, New York, N. Y.)

Steel Products Manual Carbon Steel Structural Sections Section 4 August 1943

American Society for Testing Materials (260 South Broad Street, Philadelphia 2, Pa.)

The letter T following a designation indicates the standard is Tentative. Where an additional number appears within parentheses, it indicates there is an Emergency Alternate Provision attached to the standard. Each standard is 25¢.

Low Tensile Strength Carbon-Steel Plates of Structural Quality for Welding A78-43
Low Tensile Strength Carbon-Steel Plates of Flange and Firebox Qualities A89-43
Lap-Welded and Seamless Steel Pipe for High-Temperature Service A106-43T
Carbon-Silicon Steel Plates of Ordinary Tensile Ranges for Fusion-Welded Boilers and Other Pressure Vessels A201-43
Permeability of Feebly Magnetic Materials A259-43T
Aluminum Sheet and Plate B25-43T
Aluminum-Base Alloy Sand Castings B26-43T
Brass Sheet and Strip B36-43T
Copper Pipe, Standard Sizes B42-43
Seamless Copper Tubing, Bright Annealed B68-43
Seamless Copper Tubes B75-43T
Aluminum-Maganese Alloy Sheet and Plate B79-43T
Rolled Copper-Alloy Bearing and Expansion Plates for Bridge and Other Structural Uses B100-43
Phosphor Bronze Sheet and Strip B103-43
Aluminum-Base Alloy Permanent Mold Castings B108-43T
Aluminum-Magnesium-Chromium Alloy Sheet and Plate B109-43T
Leaded Brass Sheet and Strip B121-43T
Aluminum-Manganese Alloy Sheet and Plate for Use in Welded Pressure Vessels B126-43T
Miscellaneous Brass Tubes B135-43T
Manganese Bronze Rods, Bars, and Shapes B138-43
Phosphur Bronze Wire B159-43T
Aluminum Sheet and Plate for Use in Welded Pressure Vessels B178-43T
Thermal Shock Test on Glass Containers C149-43
Testing Molded Materials Used for Electrical Insulation D48-43T
Red and Brown Iron Oxide Pigments D84-43T
Saponification Number of Petroleum Products by Color-Indicator Titration D94-43T
Testing Electrical Insulating Oils D117-43
Testing Oleoresinous Varnishes D154-43
Orange Shellac and Other Lacs D237-43T

National Board of Fire Underwriters (207 East Ohio Street, Chicago 11, Ill.)

General List of Standards November 1943
Wireways, Auxiliary Gutters, and Associated Fittings October 1943

National Electrical Manufacturers Association (155 East 44th Street, New York, N. Y.)

Feeder Voltage Regulator Standards Publication No. 43-86 October 1943

U. S. Government

National Bureau of Standards (Washington, D. C.)

Carbonated Beverage Bottles Simplified Practice Recommendation R123-43 (superseding R123-30) May 1, 1943
Iron and Steel Pop Safety Valves Simplified Practice Recommendation R201-43 September 15, 1943
Old Growth Douglas Fir Standard Stock Doors (second edition) Commercial Standard CS73-43 (superseding CS73-38) June 15, 1943
Paper Boxes for Toiletries and Cosmetics Simplified Practice Recommendation R200-43 July 1, 1943
Photographic Paper Simplified Practice Recommendation R98-43 (superseding R98-36) August 1, 1943
Simplified Practice Recommendations Alphabetical List Revised to October 15, 1943 Letter Circular LC-733 (superseding LC-718)
Sources of Radio Information Letter Circular LC-735 November 13, 1943
Underground Corrosion: Letter Circular LC734 October 12, 1943

United States Department of Agriculture (Washington, D. C.)

Check List of Standards for Farm Products of the Food Distribution Administration November 1943
Peanuts and Peanut Mixed Hay Tentative United States Standards for November 12, 1943
Grades of Canned Apples November 1, 1943

Army Air Forces (Washington, D. C.)

Material and Process Specifications (superseding issue of October 10, 1943 November 10, 1943

War-Time Methods of ASA

by P. G. Agnew

Secretary, American Standards Association

UNDER war conditions many standardization jobs must be done in weeks, whereas under normal conditions months or perhaps years might be required to perfect them and to get the concurrence of all interested groups.

With this in mind, a year before Pearl Harbor the American Standards Association set up a streamlined emergency procedure to handle such emergency problems. The resulting standards are "American War Standards," and the committees in charge are called "War Committees."

The chief function of the American Standards Association in peacetime is to provide systematic means for establishing American Standards, six hundred and fifty-three of which have already been developed. To do this, under normal conditions when development of a standard is requested, the ASA brings together manufacturers, distributors, consumers, technical specialists, and others directly concerned, and determines whether these interests desire a national standard on the subject. If they do, the ASA provides for the organization of a balanced committee consisting of official representatives of the bodies directly interested to work out the standard. Usually this committee works under the administrative leadership of an association or technical society, known as the "sponsor." When the committee has reached substantial agreement in regard to the provisions of the proposed standards, so that the ASA is definitely assured that the standard represents a truly national consensus, the ASA approves it as an "American Standard." This approval is given by the ASA Standards Council, which is made up of representatives of all the trade associations, technical societies, and government departments which are Member-Bodies of the Association. The Council acts after receiving recommendations from the "correlating committees," special industry committees qualified to act on standards in the field concerned.

The basic principle underlying all ASA work is that a consensus of those having a substantial interest in the scope and provisions of a proposed standard must be reached.

Streamlined Procedure Cuts Corners

In streamlining its procedure for war-time, the American Standards Association has cut corners, but has made every effort to maintain the spirit of the regular work so that each War Standard shall represent a war-time consensus. The war-time method of operation may be summarized as follows:

1. A request for a War Standard may be made by any responsible agency—governmental, industrial, or technical.

2. The request is referred to the Chairman of the Standards Council, together with background material collected by the ASA staff. The Chairman, after consulting with the chairman of the appropriate correlating committee, decides whether the project shall be undertaken.

3. Each emergency project is placed in the hands of a "War Committee." The personnel of a War Committee includes outstanding individuals collected from all groups primarily concerned with the undertaking—producers, consumers, distributors, and specialists in the field. In most cases the members of War Committees are selected after consultation with the groups concerned in order to preserve the spirit of representation, but in order to save time and unnecessary motions they are not formally designated as representatives of the cooperating groups.

4. If a regular ASA sectional committee is already in existence on the subject under consideration, the personnel of the War Committee is drawn in whole or in part from the sectional committee. Sponsor organizations are consulted. Also, all members of the sectional committees are asked to criticize the draft standards. In each case a time limit is set for the return of such comments.

5. After reviewing the comments and criticisms resulting from the circulation of the draft, the final vote of the War Committee is taken. In experience so far, the majority of committees have reached unanimous decisions. In all other cases the decision has been nearly unanimous.

6. The standard then goes to the correlating committee in charge, of which a five-sixths affirmative vote is necessary.

7. Final approval rests with the Chairman of the Council, who acts for the Council.

8. The approved American War Standard is then published by the ASA. A distinctive format, the words "American War Standard" in the title, and buff-colored paper rather than the usual white, distinguish a War Standard from a regular American Standard.

9. Members of the Standards Council and of the correlating committee are kept informed of developments throughout the process.

The American Standards Association, through this war-time method, has greatly speeded up its work and has been able to render greatly increased service to the Government, to industry, and to the public. Hence it is hoped that much of the spirit and something of the method itself can be carried over into peacetime.

War-Time Jobs 1943

Status as of Annual Meeting

Title	Requested by	Status
Building Code Requirements for Iron and Steel (A57)	WPB	Recommendations transmitted to WPB
Protective Lighting for Industrial Properties (A85-1942)	U.S. War Dept and Insurance Committee on Plant Protection	Standard issued and in use
Screw Threads (B1)	WPB	
High-Temperature Bolting (B1.4-1942)		Standard issued and in use
Acme Screw Threads for Special Purposes (B1.5)		In draft form
Truncated Whitworth Form (B1.6)		In draft form
Cylindrical Fits (B4)	Automotive Council for War Production and WPB	Standard under development
Accuracy of Engine Lathes (B5.16-1941)	National Machine Tool Builders' Assn	Standard issued and in use
Pressure Ratings for Cast-Iron Pipe Flanges and Flanged Fittings, Class 125 (B16a1-1943)	WPB	Standard issued and in use
Pressure-Temperature Ratings for Steel Pipe Flanges, Flanged Fittings, and Valves (B16e5-1943)	WPB	Standard issued and in use
Domestic Electric Refrigerators (B38)	OPA	Stopped when production ended
Code for Electricity Meters (C12WS-1942)	Electric Light and Power Group and National Bureau of Standards	Revision issued and in use
Replacement Parts for Civilian Radio (C16)	OPA and WPB	
Fixed Paper-Dielectric Capacitors (C16.6-1943)		Standard issued and in use
Dry Electrolytic Capacitors (C16.7-1943) (2nd edition)		Standard issued and in use
Simplified List of Home Radio Replacement Parts (C16.8-1943)		Standard issued and in use
Power and Audio Transformers and Reactors (C16.9-1943)		Standard issued and in use
Volume Controls (C16.10)		In draft form
Electrical Measuring Instruments (C39)	OPA and WPB	
Electrical Indicating Instruments (2½- and 3½-Inch, Round, Flush-Mounting, Panel-Type) (C39.2-1943)		Standard in use by Armed Forces for procurement. Used by Canada. Used in WPB order on instrument production.
Shock Testing Mechanism for Electrical Indicating Instruments (2½- and 3½-Inch, Round, Flush-Mounting, Panel-Type) (C39.3-1943)		Standard in use by Armed Forces for procurement. Used by Canada.
Dimensions for External Radio-Frequency Thermocouple Converters (120 Milliamperes to 10 Amperes Inclusive) (C39.4-1943)		Standard in use by Armed Forces for procurement
External Ammeter Shunts for Panel-Type Instruments (C39)		In draft form
Specifications for Design and Construction of Resistance Welding Equipment (C52)	WPB	In draft form
Flat Irons (C70)	OPA	Stopped when production ended
Machine Tool Electrical Standards (C74-1942)	National Machine Tool Builders' Assn and WPB	Standard issued and used in WPB Order

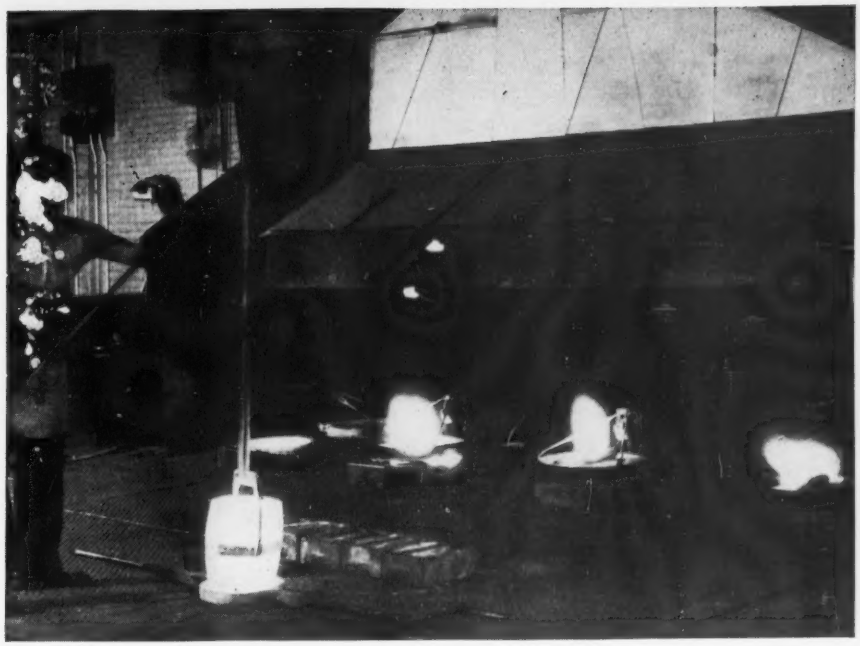
Title	Requested by	Status
*Military Radio Equipment and Parts (C75)	WPB	
Ceramic Radio Insulating Materials, Class L (C75.1-1943)		Standard in use by Armed Forces for procurement
Steatite Radio Insulators (C75.2-1943)		Standard in use by Armed Forces for procurement
Fixed Mica-Dielectric Capacitors (C75.3-1943)		Standard in use by Armed Forces for procurement
Ceramic Radio Dielectric Materials, Class H (C75.4-1943)		Standard in use by Armed Forces for procurement
External Meter Resistors (Ferrule Terminal Styles) (C75.5-1943)		Standard in use by Armed Forces for procurement
Glass-Bonded Mica Radio Insulators (C75.6-1943)		Standard in use by Armed Forces for procurement
Fixed Composition Resistors (C75.7-1943)		Standard in use by Armed Forces for procurement
Glass Radio Insulators (C75.8-1943)		Standard in use by Armed Forces for procurement
Power-Type Wire-Wound Rheostats (C75.9)		In draft form
Wire-Wound Variable Resistors (Low Operating Temperature) (C75.10)		In draft form
Fixed Ceramic-Dielectric Capacitors (Temperature Compensating Type) (C75)		In draft form
Fixed Paper-Dielectric Capacitors (Hermetically Sealed in Metallic Cases) (C75)		In draft form
Fixed Molded Paper-Dielectric Capacitors (Limited Sizes) (C75)		Draft in use by Signal Corps for procurement
Crystal Unit CR-1 ( ) /AR (C75)		In draft form
Dynamotors (C75)		In draft form
Low Tension (600 Volts RMS) Radio and Instrument Wire (C75)		In draft form
Porcelain Radio Insulators (C75)		In draft form
Laminated Thermosetting Plastic Materials (Sheet and Plate) (C75)		In draft form
Molded Thermosetting Plastic Materials (C75)		In draft form
High Stability Fixed Wire-Wound Resistors (Bobbin or Spool Styles) (C75)		In draft form
Thermoplastic Materials (Rigid) (C75)		In draft form
Toggle Switches (C75)		In draft form
Vibrators (C75)		In draft form
Accurate Fixed Wire-Wound Resistors (One Percent Maximum Tolerance) (C75)		In draft form
Fixed Wire-Wound Resistors (Power Type) (C75)		In draft form
Specifications and Standards for Sheets and Sheeting (L4)	OPA	Draft used by Govt to peg price ceilings on sheets to standards of quality
Sizes of Children's Garments and Patterns (L11)	OPA	In abeyance
Color Fastness Terminology (L14)	OPA	Work started
Women's Industrial Clothing (L17)	OPA and WPB	
Women's Industrial Dresses (L17.1)		In draft form
Women's Industrial Slacks, Overalls, and Coveralls (L17.2)		In draft form
Women's Industrial Jackets, Shirts, and Aprons (L17.3)		In draft form
Application of Statistical Methods to Quality Control of Materials and Manufactured Products (Z1)	U.S. War Dept	
Guide to Quality Control (Z1.1-1941)		Standards issued and in use by industry
Control Chart Method of Analyzing Data (Z1.2-1941)		Standards issued and in use by industry
Control Chart Method of Controlling Quality during Production (Z1.3-1943)		Adopted by Great Britain, Australia, and Canada

*Used as emergency standards by Australia and Canada.

War-Time Jobs — 1943

Status as of Annual Meeting (continued)

Title	Requested by	Status
Approval and Installation Requirements for Gas Burning Appliances (Z21)	WPB	
Gas Ranges (Z21.1ES-1942)		Standard issued and in use
Gas Water Heaters (Z21.10WS-1942)		Standard issued and in use
Graphical Symbols for Power, Control, and Measurement (Z32.3-1943)	National Electrical Mfrs Assn	Issued as a regular American Standard
Allowable Concentrations of Toxic Dusts and Gases (Z37)	ASA Committee on Toxic Dusts and Gases	
Cadmium (Z37.5-1941)		Standard issued and in use
Manganese (Z37.6-1942)		Standard issued and in use
Metallic Arsenic and Arsenic Trioxide (Z37.9-1943)		Standard issued and in use
Xylene (Z37.10-1943)		Standard issued and in use
Styrene Monomer (Z37)		In draft form
Photographic Exposure Computer (Z38.2.2-1942)	U.S. Navy	Standard issued. More than 100,000 in use
Protective Occupational Footwear (Z41)	WPB and OPA	
Men's Safety-Toe Shoes (Z41.1-1943) (2nd edition)		Standards issued and used in WPB order on safety shoe production
Men's Conductive Shoes (Z41.3-1943) (3rd edition)		
Men's Explosives-Operations (Non-Sparking) Shoes (Z41.4-1943) (2nd edition)		
Men's Electrical-Hazards Shoes (Z41.5-1943) (3rd edition)		
Men's Foundry (Molders) Shoes (Z41.6-1943) (3rd edition)		
Women's Safety-Toe (Oxford) Shoes (Z41.2-1943) (3rd edition)	WPB and OPA	Standards issued and used in WPB order on safety shoe production
Women's Safety-Toe (High) Shoes (Z41.7-1943) (2nd edition)		
Women's Explosives-Operations (Non-Sparking) Shoes (Z41.8-1943) (2nd edition)		
Women's Conductive Shoes (Z41.9-1943) (2nd edition)		
Specification and Description of Color (Z44-1942)	General Electric Co, Interchemical Corp, and WPB	Standard issued and in use
Packages for Electronic Tubes (Z45)	WPB	In draft form
Color Code for Lubrication of Machinery (Z47)	National Machine Tool Builders' Assn and WPB	In draft form
Safety in Electric and Gas Welding and Cutting Operations (Z49)	Dept of Labor, National Electrical Mfrs Assn, American Welding Soc, and International Acetylene Assn	In draft form
Protective Occupational (Safety) Clothing (Z51)	OPA and WPB	
Leather Aprons (Z51.1)		In draft form
Leather Cape Sleeves (With or Without Bibs) (Z51.2)		In draft form
Leather Leggings (Knee Length) (Z51.3)		In draft form
Leather Welding Coats (Z51.4)		In draft form
Leather Overalls (Z51.5)		In draft form
Sleeves (Z51.6)		In draft form
Leather Gauntlet Gloves (Z51)		In draft form
Coated or Impregnated Textile Aprons (for Protection against Corrosive Material)		In draft form
Photography and Cinematography (Z52)	WPB	Standards under development
Washing Machines	OPA	Stopped when production ended



Exhaust hoods collect fumes and dusts in this foundry. Prevention of diseases due to harmful dusts and gases is an important ASA project.

American Safety Standards In War Production

by Colonel John Stilwell[1]

President, National Safety Council

"WERE there any casualties?" was the first and only question asked by a group of industrial engineers who had just listened to an impressive technical description of the raising of the one-time *Normandie*, now the U.S.S. *Lafayette*. All who heard the story had been stirred by the magnitude of the technical achievement, but it is significant that the possible loss in manpower and in human suffering was the first thought expressed. That the answer was "No deaths" is a tribute to the years of earnest effort on the part of industrial, insurance, labor, and governmental groups who have cooperated in forwarding the industrial safety program under the leadership of the National Safety Council and in developing American Safety Standards.

One needs only to recall that not so long ago the accepted formula for accidents in the construction of tall buildings in New York was one death per floor to realize what the accident toll could have been in an exceptionally hazardous undertaking such as the salvaging of the U.S.S. *Lafayette*. Due to the efforts of organizations such as the National Safety Council and the American Standards Association safe practices are now automatic and are accepted without notice in innumerable cases where 25 years ago the accident hazard was considered to be the normal condition. Today, when manpower and production facilities are at a premium, the ratio of time lost through industrial accidents to speed of production may determine whether a sufficient number of planes, tanks, guns, and ammunition reach the boys fighting in the front lines.

The National Safety Council which, as its name implies, devotes its entire time to forwarding the national safety program, takes pride in the knowledge that it was largely instrumental in organizing national cooperation on safety problems through the American Standards Association. We are glad to take this opportunity to congratulate the Association on the accomplishments of its first 25 years.

The National Safety Council had an important role in the early history of the American Standards Association, then the American Enginering Standards Committee. The demand for coordination of safety standards, fathered by the National Safety Council, actually

[1] Vice-president, Consolidated Edison Company, New York; member ASA Board of Directors.

resulted in a reorganization of the American Engineering Standards Committee to bring into its membership trade associations and Government departments in addition to the five technical societies which were the original members.

Coordinated Action Needed

The need for coordinated action was determined by the National Safety Council through a survey undertaken in 1918. This showed that state departments of labor and industrial accident commissions in the principal industrial states were establishing rules and regulations without consulting each other and without attempting to correlate the technical requirements of the regulations. At the same time the insurance groups were also establishing specific requirements for the removal of accident hazards. In many cases these requirements conflicted with the state regulations. Meanwhile, individual companies had largely gone ahead on their own account in the development of safety rules. It was suggested that the national government have the responsibility for coordinating safety standards, but industry, through the National Safety Council, thought the work could be more effectively done through private agencies. It was placed, therefore, in the hands of the reorganized American Engineering Standards Committee.

Through the years the National Safety Council has continued the leadership it exercised in starting this national program. The results have been gratifying to all concerned. The 105 safety standards approved by the American Standards Association have played an important part in developing a national conscience in regard to industrial accidents and a national recognition of the unnecessary waste in human suffering and in loss of production. The effects in industry today of such widely accepted American Standard safety codes as the standards for floor and wall openings, industrial ladders, and elevators cannot even be estimated. They are so well accepted in national engineering that few are conscious of their use or stop to think that at one time they did not exist.

Such influential safety documents did not spring into being full grown. They developed out of a serious need for the elimination of wasteful accidents, and grew through the give-and-take of conference after conference of a wide range of organizations concerned.

Abrasive Wheel Code Revised

The American Standard Safety Code for Abrasive Wheels, for example, an important peacetime standard, has just been revised to bring it up-to-date with new developments and to incorporate the results of experience in its use. Before such a code was used the explosion of abrasive wheels while operated at high speed caused serious injuries. The American Standard recommends maximum speeds, types of protective guards, and requirements for the handling, storage, and mounting of the wheels. It has been adopted in principle by at least 27 state regulatory bodies and is used and distributed extensively by the manufacturers of abrasive wheels. What this means in terms of accident prevention cannot be estimated.

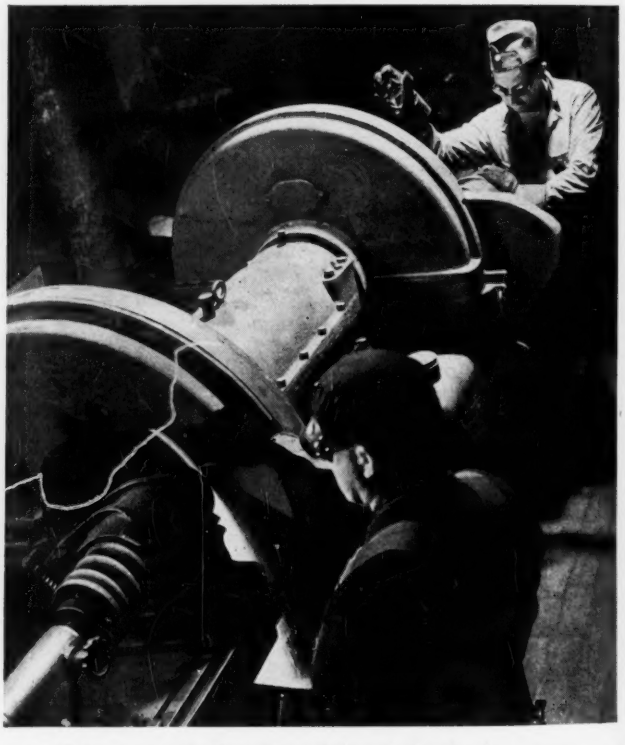
The present emphasis on prevention of lost-time accidents has led to the training of a great number of new Safety Engineers. War Training Courses for these engineers are now being carried on through the colleges under the supervision of the U. S. Department of Labor and the U. S. Office of Education. A packet of selected American Safety Standards has been made up to use in these courses. These standards thus are becoming part of the education equipment of the new quota of industrial safety engineers.

To determine the number of accidents and why they have occurred is one of the important first steps in their control. Two American Standards are now used widely not only by industry but also by the Ordnance Department, the Air Corps, and the Navy Department in their control of industrial accidents in production plants under their supervision. These are the American Standard Method of Compiling Industrial Injury Rates and the American Recommended Practice for Compiling Industrial Accident Causes. The U. S. Department of Labor and the National Safety Council both make use of these two standards in peacetime as well as for compiling accident statistics during the war effort.

War Lighting Standard Protects Against Sabotage

The American War Standard for Protective Industrial Lighting has been important in guiding war industries in lighting their plants for the prevention of theft and sabotage. It has not yet had a full use, however, because it could not be applied in sections where brilliant lighting has not been permitted. Now that the dim-out has been lifted on the coasts it may be expected that this standard will have an even greater application.

The opening of new plants, expansion of old plants, and greatly increased employment has focused attention on the problem of sanitation. For this reason the American Standards for Industrial Sanitation have been in



Wide use of Grinding Wheel Code has prevented many injuries due to wheels shattering at high speeds.

great demand during the past year as guides in providing adequate facilities for both men and women employed in industry. The result of furnishing sufficient equipment for cleanliness, for lunchrooms, and for rest rooms is evident immediately in better attendance and improved production records.

One of the most important of all ASA projects, since it helps to control industrial diseases, is the project to establish allowable concentrations of toxic substances. In most cases it is impossible to eliminate entirely the gases and dusts generated by dangerous substances in the air of workplaces. Before effective control measures can be applied, it is necessary to determine what concentration of the dust or gas can be permitted in the air without harm to the workers. The standards already developed set safe concentrations for carbon monoxide, hydrogen sulfide, carbon disulfide, benzene, chromic acid and chromates, and mercury. Inasmuch as they help to keep men on the job these standards are a contribution toward the war effort as well as toward efficiency in peacetime. In addition, certain allowable concentration standards have been developed for the express purpose of controlling hazardous substances used in quantity especially for the war effort. Such are the standards for cadmium, manganese, arsenic, and xylene.

When the shortage of leather, steel, and rubber threatened to cut the production of safety shoes to the point where the protection of industrial workers was endangered, the War Production Board asked the American Standards Association to develop specifications for shoes which would offer sufficient protection to the workers and yet at the same time conserve materials and production facilities. Nine safety standards for both men's and women's protective footwear for this purpose have been accepted by the War Production Board and have been included in Limitation Orders affecting all safety shoe production.

In spite of all the work which has already been done, the records compiled in *Accident Facts*, published annually by the National Safety Council, show many operations and even whole industries which could be benefited by additional safety standards. The Safety Code Correlating Committee, which acts as an advisory body to the American Standards Association on all safety standards, has already indicated several additional subjects which need standardization. As new industries develop around the inventions of the present war, they too will undoubtedly need additional standards to solve their special problems.

It is our hope that as these future problems unfold, cooperation between the National Safety Council and the American Standards Association will show as impressive a record of achievement as has been shown in the first 25 years of ASA history.

Recent OPA Price Orders Which Refer to Standards

Radio Replacement Parts (Amendment 6 to Revised Price Schedule 84, effective November 17, 1943)

Manufacturers' dollar-and-cents ceiling prices are established by this amendment for American War Standard power and audio transformers and reactors. Manufacture of these parts was limited by the War Production Board, beginning July 1, 1943, to the sizes and types specified and conforming to the specifications prescribed in American War Standard C16.9-1943. This standard is one of a series for home radio replacement parts developed by the American Standards Association at the request of the Office of Price Administration.

The transformers and reactors specified in this standard represent the minimum number of different sizes and types deemed adequate for servicing the large variety of home radios in use today. It was only through such standardization that the few parts manufacturers not totally converted to direct war work could produce parts which will fit practically any make of home radio. The minimum performance standards are intended to define units which will use a minimum of strategic materials and assure satisfactory performance from an electrical and service standpoint. Thus, these standards served the twofold purpose of assuring the production of an adequate supply of serviceable home radio parts and at the same time provided a basis for sound and effective price control.

Rubber Hose and Belting. (Amendment 15 to Maximum Price Regulation 149, effective November 9, 1943)

Maximum manufacturers' prices for sales to consumers are fixed for grade 1 neoprene conveyor and elevator belting, transmission belting, molded braided type air and air tool hose, and Buna-N winterized wire braid hydraulic control hose.

Grade 1 belting is defined as having a minimum tensile strength of 2,000 pounds per square inch in the covers and a minimum friction of 16 pounds per square inch between plies. Dollar-and-cents ceilings for belting meeting these minimum requirements are based on number of plies and weight of duck used. The Buna-N hydraulic control hose priced under this regulation must meet Federal Specification AN-ZZ-H-623a. Prices are scheduled according to size and braid. Manufacturers may add charges for splicing, stitching, and other operations associated with the manufacture and sale of these commodities calculated on the same basis that such charges were calculated on October 1, 1941.

Waterproof Rubber Footwear. (Amendment 5 to Maximum Price Regulation 132, effective December 1, 1943)

Makes tentative technical changes in existing minimum specifications contained in Maximum Price Regulation 132 to give them greater flexibility and adaptability to provide for the use of Buna-S synthetic rubber in the manufacture of waterproof rubber footwear. In permitting the use of thinner gauges of Buna-S compounds, a minus tolerance of 15 percent or 0.005, whichever is greater, is permitted on any compound gages containing Buna-S (GR-S), providing that such gages shall not be reduced to less than 0.015 inch and that after such reduction the item of footwear will give fairly equivalent serviceability. New specifications are provided for several alternate constructions involving the use of binder soles, filler soles, and toe strips or foxing. After specific approval by OPA, manufacturers may also make other changes in these specifications when such changes improve the serviceability of the footwear or avoid a threatened impediment to production.

Pressure Preservative Treatment of Forest Products (Maximum Price Regulation 491, effective November 19, 1943)

Fixes dollar-and-cents ceiling prices for service of pressure treating railroad ties, lumber, piling, poles, and other products with creosote and similar preservatives to increase their durability. All specifications as to treatment methods and quality of preservatives refer to, or have the meaning given in, the Manual of Recommended Practices of the American Wood-Preservers' Association, or any applicable Federal government specification.

How Standards Help Meet Government Orders

by Herbert L. Spencer

Quality Engineer, Bendix Radio Division of Bendix Aviation Corporation

"FOR every three in '43 they must have four in '44"—

So stated Lieutenant Colonel S. K. Wolf, Deputy Director in Charge of Production, Radio and Radar Division, War Production Board, at a conference in Baltimore on "Applied Standardization" recently.

The Government orders to which Colonel Wolf referred upon this occasion were active military electronic equipment requirements for 1944, presumably including those lend-lease channels which have, in the past, constituted a major portion of the total output.

What part will standardization play in this program for 1944? Any such increase over present production levels *must* be accomplished through standardization and simplification.

The industry must contemplate a very limited, if any, change in 1944 over the present manpower and plant capacity conditions. Major General Hershey has indicated the certainty of Armed Forces requirements approximating one million men by next July first, which drain, in view of the deferment of fathers, must certainly encroach upon some skilled manpower now employed in the maintenance of production schedules.

Plant expansion will not materially affect production levels since the most that can be expected would be a general replacement of present badly worn and overtaxed mechanical equipment.

These statements are necessarily general in a treatment of standardization and are injected herein as a basis to justify our focusing full attention upon what *can* be done through simplification of present Government practices.

That Government Agencies themselves are well aware of the urgent need for standardization is indicated by the following excerpts from an approved release issued by the Radio Division of the Bureau of Ships:

"The Bureau views with concern the trend toward increasingly complex radio and allied electronics equipment. This tendency is objectionable because of:

(*a*) The large variety of slightly different components to be manufactured for initial production;

(*b*) The difficulties confronting servicing personnel in maintaining equipment;

(*c*) The astronomically large variety of components that must be carried in stocks throughout the world.

". . . While it is fully appreciated that the problem posed is not easy, it is believed that in the forward rush of the War the virtues of simplicity are in danger of neglect. The Bureau has no desire at all to impair performance to secure pure simplicity, but is not at all convinced that all present complexities are necessary. . . .

"The earnest cooperation of all design agencies will be appreciated. It is now thought that the result of such action will be better equipment for the ultimate purpose which is victory."

Certainly these statements demand the immediate attention of the industry.

We all realize that war is the most wasteful of all human endeavors. When this country plunged into the gigantic task of supplying the allied arsenals the world over, little time and consideration could be given to coordination of production methods existent at the time. The job was to get into production to replace the trainees' "broomsticks" with fighting gear. That industry "came through" is evidenced by Allied successes in every theater of the globe.

PANEL INSTRUMENT STANDARDIZATION
THESE 2½" INSTRUMENTS ARE REPRESENTATIVE OF THE APPROXIMATELY 18,500 COMBINATIONS OF 2½" INSTRUMENTS THE INDUSTRY HAD TO BUILD BEFORE STANDARDIZATION BY REDUCING THE VARIETY OF CASES, DIALS, RANGES, AND PROPRIETARY DIMENSIONS THE COMBINATIONS OF 2½" INSTRUMENTS HAVE BEEN REDUCED TO APPROXIMATELY 1850. THE INSTRUMENT BELOW MEETS THE DIMENSIONS NOW APPROVED BY ALL BRANCHES OF THE ARMED SERVICES FOR 2½" USE.
COOPERATION OF THE ARMED SERVICES, THE INSTRUMENT MANUFACTURERS AND THE AMERICAN STANDARDS ASSOCIATION HAS REDUCED THE VARIETY OF TRIMETYS FROM 37,500 TO 3,300. THE AMERICAN WAR STANDARD COVERING THIS IS C39.2-1943. IT IS APPROVED BY ALL THE ARMED SERVICES. ASSURES INSTRUMENTS OF THE HIGHEST DEGREE OF QUALITY. IT HAS GREATLY SIMPLIFIED INSTRUMENT INDUSTRY PRODUCTION PROBLEMS. . . SERVED TO HELP MEET THE TREMENDOUS EXPANSION IN PRODUCTION . . . HAS SIMPLIFIED PURCHASING FOR THE THOUSANDS OF USERS. . . GIVES ASSURANCE OF GETTING DUPLICATE DIMENSIONS AND RATINGS FROM ANY ONE OF THE MANY INSTRUMENT MANUFACTURERS WHO CONFORM TO C39.2-1943. STANDARDIZATION SPEEDS MAINTENANCE IN THE COMBAT ZONE.
THESE 3½" INSTRUMENTS ARE REPRESENTATIVE OF THE APPROXIMATELY 18,500 COMBINATIONS OF 3½" INSTRUMENTS THE INDUSTRY WAS BUILDING BEFORE STANDARDIZATION. THE INSTRUMENT BELOW REPRESENTS THE COMPARATIVELY SMALL VARIETY OF APPROXIMATELY 1850 COMBINATIONS THAT DO THE JOB NOW REGARDLESS OF THE GROWTH OF INSTRUMENT REQUIREMENTS OF AN INDIVIDUAL PROJECT, IT CAN BE MET BECAUSE WHERE NECESSARY, SEVERAL DIFFERENT MANUFACTURERS CAN SUPPLY TO THE SAME DIMENSIONS.

This exhibit demonstrates the savings from standardization of panel-type instruments.

"Standardization Worked"

In retrospect, if one can be retrospective in the middle of a war, a certain Government agency charged with the coordination of war production recently stated that "where standardization existed, its influence measured in terms of time and permanent value cannot be estimated. Suffice to say that in *every* instance, *standardization worked.*"

Let those of us charged with the cooperative efforts toward *voluntary standardization* approach the challenge of increased production in 1944 with new

enthusiasm. We have, through the joint efforts of Government and industry working through the American Standards Association, prepared and approved standards covering approximately 60 percent of the total volume of electronic components.

The Armed Forces approval of these American War Standards by the Signal Corps Standards Agency and the Radio Division of the Bureau of Ships marks a milestone in the progress of standardization which to electronic equipment manufacturers can open the door to unprecedented simplification in the methods of handling components. Any permanent value to industry of this accomplishment must be estimated in proportion to the actual acceptance and establishment of American War Standards. If, as has been indicated, approved American War Standard components can be introduced into existing sources of supply without unduly disturbing present production levels, the 1944 production goal may conceivably be accomplished *without any other action*, since presumably:

(*a*) Procurement of components will be simplified;

(*b*) Many present non-productive but mandatory purely processing operations necessitated by the lack of conformity within the various Government procurement agencies may be eliminated altogether or considerably reduced;

(*c*) An interchangeability of components scheduled for use in government equipments can be *gradually* accomplished with a view of establishing the ideal, "a common bin";

(*d*) The control and scheduling of components to equipment manufacturers can be accomplished on a more flexible basis. Present situations where huge inventories of components often badly needed elsewhere cannot be released because of marking or other "processing" reasons can generally be alleviated;

(*e*) Standard gradings and ratings will materially enhance the value and useability of huge stocks of accumulated components purchased in accordance with a particular performance characteristic. The problems of controlled inventories, both present and post war, will be greatly simplified through jointly accepted Army-Navy-Industry standard markings, nomenclature, color coding, sizes, ratings, testing and inspection methods, and performance characteristics;

(*f*) Field service stocks and controls, now practically impossible to maintain, could be simplified into practicability.

Certainly this is a goal well worth "shooting for" in 1944.

New Foreign Standards Now in ASA Library

THE following new and revised standards, just received by the American Standards Association, may be borrowed by ASA Members, or ordered through the ASA Library.

Great Britain

Water Tube Boilers and their Integral Superheaters B.S. 1113:1943

War Emergency Standards

Flushing Cisterns for Water Closets B.S.1125:1943

Primers for Camouflage Paints B.S.1128:1943

Rubber and Insertion Jointing for Flange and Similar Joints Subject to (1) Water pressure, at normal atmospheric temperatures (2) Low pressure steam (under 30 lb/sq in) (3) High pressure steam (30 lb/sq in) and over B.S. 945:1943

Timber Ladders B.S. 1129:1943

British Standard Codes of Practice

Heating and Hot Water Service Installations CP2:1943

"Gilding Metal" Strip for Bullet Envelopes BS/STA19

Economy Soft Solders (Appendix A to BS/STA 7)

Draft British War Emergency Standards

Preservation of Iron and Steel other than Buildings CG (C) 3859

Test Pieces for Use in the Training of Welders CG (WE) 4204

New Zealand

Emergency Standard Specifications

Hydroquinone (Paradihydroxybenzene) N.Z.S.S. E. 130

Metol (Mono-Methyl-Paraminophenol Sulphate) N.Z.S.S. E.133

New Member on Inter-American Advisory Committee

Mario Ascarelli of the U. S. Steel Export Company, New York, has been appointed an official member of the Inter-American Advisory Committee of the American Standards Association. Since organization of the committee he has been alternate member for Hemon Greenwood who has represented the U. S. Steel Export Company but who is now vice-president of the Carrier Company. Mr. Greenwood now represents this company on the Advisory Committee.

The Inter-American Advisory Committee was set up to guide the ASA in a program of cooperation with similar standardizing bodies functioning in various Latin-American countries, such as Argentina, Brazil, and Uruguay. This committee endeavors to promote development of standardization activities and a thorough interchange of technical data among the other members of the Western Hemisphere family of nations in order to provide stronger bonds for post-war trading.

Members of the Inter-American Advisory Committee include: R. E. Zimmerman, vice-president of the United States Steel Corporation, chairman; Mario Ascarelli, U. S. Steel Export Company; Dr. Lyman J. Briggs, director, National Bureau of Standards; E. F. Callahan, vice-president, International General Electric Company; Dr. Alexander V. Dye, economic consultant, National Foreign Trade Council; H. Greenwood, vice-president, Carrier Company; T. W. Howard, department of manufacture, United States Chamber of Commerce; C. L. Warwick, secretary-treasurer, American Society for Testing Materials; John W. White, vice-president, Westinghouse Electric International Company; Carroll L. Wilson, director, Bureau of Foreign and Domestic Commerce, and J. T. Wilson, president, Export Managers Club.

Trends in Standardization

by P. G. Agnew

Secretary of the American Standards Association

1. The country is becoming standards-conscious. Controversies over standards in the War Agencies and between Congress and the Administration are but symbols of this increasing awareness of standards as factors in the economic and industrial life of the country.

2. The international aspect of standardization is increasing in importance at an unprecedented rate. Among the allied nations this is a direct effect of the war and of Lend Lease. To provide for urgent war and rehabilitation problems, the national standardizing bodies in these countries are setting up a United Nations Standards Committee, with offices in London and in New York or Washington. The ASA is affiliating. Outstanding examples of such needs are those of repair parts for aircraft, and of optical and radio aids to air navigation.

The significance of standards in international trade is coming to the fore in connection with plans for the industrialization of many regions of the world. China, for example, starting from scratch, can be guided by the experience of other countries in choosing the standards necessary to guide her industrial development. Closer cooperation has been developing between the American countries in standardization matters.

3. More and more organizations are adopting the standardization technique. This is particularly true in connection with the war effort and in planning for post-war development. The number of groups organized for standardization work is far greater than was the case during the last war; and the actual use of standards is very much greater. This is equally true of companies, of technical and trade associations, and of Government. Standards are being used not only by the military departments but throughout WPB, OPA, and other war agencies. United Nations National Relief Association has already employed a technician for standards work on clothing.

4. Standards can simplify the process of post-war reconversion. When the time comes to reconvert the war plant for peace-time development, standardization should be of even greater importance than in the original conversion for war production. We then learned that wherever component parts and methods had been standardized on a national scale the tuning up for war production was enormously simplified.

How much easier and less costly it would have been, had all subcontractors been accustomed to work to standards—and particularly to unified national standards! Unquestionably this matter of standards lies at the heart of one of the most difficult parts of the entire war effort—"the small plant problem"—which remains controversial and to a considerable extent unsolved. How many more of these small plants could have fitted into the program had they been accustomed to using standards as tools?

5. Standards are increasingly important to small companies in fitting themselves into the changing economic pattern. The problems of the small business man have become increasingly acute for 30 years as the machine has been bringing about the integration of industry more and more into large units. Just as firms which were standards-wise fitted themselves more readily into the war program, so will the smaller companies that have accustomed themselves to working to standards as controls in subcontracting, fit themselves the more easily into the post-war pattern.

In pre-war days there was an increasing trend among small companies to ally themselves to a large company as regular suppliers of materials and parts. To do so they adopted the standard practices of the large company and thus became increasingly dependent upon the one large company. Outstanding examples were the automobile industry, the large electrical companies, and the large mail order houses. This trend has increased during the war and seems certain to continue into the post-war period.

Small companies thus have an increasing stake in standardization since it helps them to fit themselves more easily into the changing economic pattern. Furthermore, the broader the scale upon which standardization is carried out the less are the fortunes of the small company tied to the fortunes of a single large company.

6. In some fields progress is being made in the unification of Army and Navy specifications. Aside from the issuance of general "Federal Specifications", the outstanding example is the work of the Aeronautical Board. Another example is the work on radio components. Both the Army and the Navy have set up agencies whose purpose is to unify specifications within their respective departments, and also to bring about joint Army-Navy Specifications. One such specification has been issued (for electron tubes). One of the many advantages of unification to industry, as well as to the services, is that it makes possible a single inspection for both services.

7. The war has brought progress in the unification of Government specifications with industrial practices; for example, through several hundred emergency modifications of "Federal Specifications". Other examples are to be found in the cooperative work of the Aeronautical Board with the National Aircraft Standards Committee and the Society of Automotive Engineers, and the cooperative work of ASA with the services. There is reason to expect increased industrial cooperation in the future in connection with Federal specifications.

8. Advertisers are making more frequent use of standards in their advertising copy. This featuring of compliance of the product with standards is being used

increasingly in advertisements of both consumer goods and producer goods.

9. Public interest in standards for consumer goods has increased rapidly during the war. The use of standards by the OPA in its price regulations, and the controversies which resulted, have greatly extended a knowledge of and interest in consumer standards. Federal standards and labeling requirements for vitamins have had a far-reaching educational effect. Organized labor is now taking an active and aggressive interest in consumer standards, which they consider important to the maintenance of their standard of living.

During the war many consumer standards have been issued by the British Standards Institution and the Standards Association of Australia.

10. Use of the specification technique in buying merchandise is coming into general use by the larger merchandising organizations. Most of the large buying groups, chain stores, and mail order houses are already making extensive use of the method.

11. Certification as a merchandising technique is developing more rapidly in other English-speaking countries than in the United States. By "certification" is meant certifying that a product complies with a standard. An outstanding example of its use was in the merchandising of the "I.E.S. Lamp". The technique is progressing in Australia, Canada, Great Britain, New Zealand, and South Africa. An ASA committee is preparing to publish a proposed standard on the subject for trial and criticism.

12. Quality control in production by statistical methods is coming into widespread use. It greatly simplifies the problem of inspection and thus facilitates the use of specifications. American Standards on the subject have been adopted in Australia, Canada, and Great Britain.

Quality control and certification are techniques which have great potential utility in implementing standards for consumer goods.

13. The all-parties-at-interest method used in the development of American Standards provides the most powerful means now available to industry for keeping itself unhampered by political control. This is, in effect, the substitution of the engineering or scientific method for political methods in the solution of innumerable problems forced upon industry by the advance of the machine age. Many governmental agencies, Federal, state, and local, have been not only willing but most responsive in sitting down with industry to use the engineering approach in working out solutions to such problems—instead of letting them drift into political situations.

For example, governmental agencies are looking to the ASA for leadership in a number of fields for the development of standards on a sound engineering basis, which can, where necessary, be used for regulatory purposes. Notable among these are: Building Code Standards, Traffic Standards, Safety Standards, and Codes for the Prevention of Industrial Diseases. Incidentally, many of these standards have removed trade barriers almost automatically, and without the use of political methods.

The number of such problems is legion. Will they be handled by the constructive engineering approach, or left to drift into political control? The answer lies with industry which, hitherto, has usually let things drift. Mr. Justice Frankfurter has said, "It is too often overlooked that government as a rule undertakes no services or regulations except after private agencies have proved themselves incapable or unwilling."

What Role for Standards In Post-War Production?

by L. F. Adams[1] and P. L. Alger[2]

I. The Value of Standards

STANDARDS have a role of great importance in the war effort, but their post-war importance promises to be far greater.

By "standards" we mean accurately defined processes, sizes, qualities, and tests of materials and equipment that have been generally agreed upon by makers, users, and the public as proper and desirable for general use. A standard may be brief, only a sentence or a paragraph, while again it may be a very long, and in some cases a highly technical, document. Such standards have four distinct values:

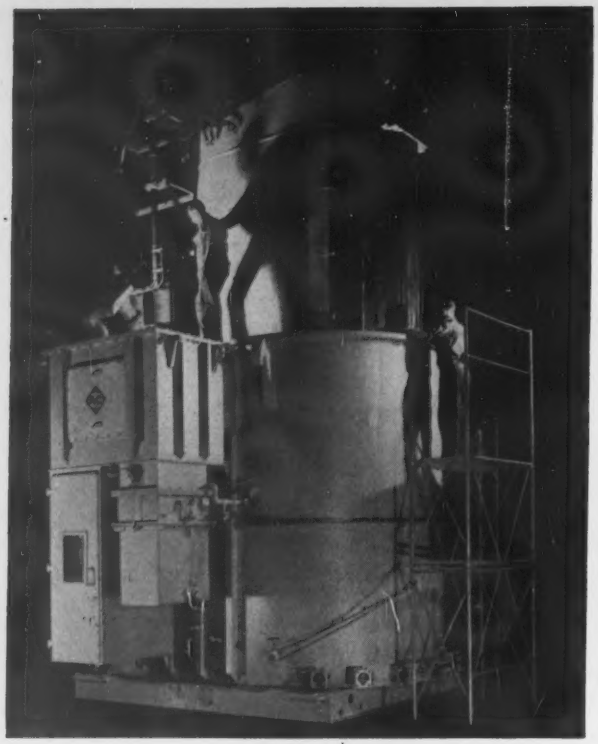
First, they educate. They set forth ideals, or quality goals for the guidance of manufacturers and users alike. They are invaluable to the manufacturer who wishes to enter a new field, and to the naive purchaser who buys a new product.

Second, they simplify. They reduce the number of sizes, the variety of processes, the amount of stock, and the paper work that largely account for the overhead costs of making and selling.

Third, they conserve. They save the losses of defects, left-over pieces, and inadequate tooling that must accompany odd-lot manufacture, by allowing large-scale production of standard designs. Each step in this direction justifies better tooling, more careful design, and

[1] General Electric Company, Schenectady, N. Y.; member of ASA Standards Council, Electrical Standards Committee, Safety Code Correlating Committee, Vice-president of U. S. National Committee of IEC.

[2] General Electric Company; member of ASA sectional committees.



New American Standards for Transformers, completed in 1943, are widely used.

more precise controls, all conserving both time and materials.

Fourth, they certify. They serve as hall-marks of quality of inestimable value to the advertiser who points to proven values, and to the buyer who sees the accredited trade mark, nameplate, or label.

Thus, standards are truly the basis of the American system of providing more goods for more people at lower cost. They enable manufacturers to enter business by matching standard qualities. They enable more goods to be produced with less materials in shorter time. They aid buyers to find and judge the goods they want. They reduce costs at every stage of production and distribution. They are, therefore, a potent influence in spreading employment and raising the standard of living.

However, like all good things in life, standards have their limitations. They do not of themselves generate inventions or create new methods. In fact, if overdone, standards may readily become a barrier to progress by making it so easy not to depart from obsolete designs.

II. The Development of Standards

Therefore, it is most important that standards should not be mandatory, nor in any way deter the free development of new and varied designs. They should be considered as norms, to which sensible people will conform because they are clearly good and economic. Emphasis should be placed on preferred sizes of bolts, buckets, frames, or what have you, giving logical gradations of capacity. No upper limit whatever should be placed on the strength of a standard size of bolt, or on the durability of a standard bucket, or the horsepower of a standard motor frame, even though normal values of these quantities may be recognized as good practice.

As Howard Coonley has so well pointed out in his address before the American Institute of Electrical Engineers[3], the development of a standard requires the unanimous agreement of the responsible committee members, representing manufacturers, users, and the public. American experience has proved many times over that the committee members of the American Standards Association and other responsible standards-making bodies are, practically without exception, fair-minded men who earnestly desire a technically sound and publicly accepted solution of their problems. If there is disagreement, therefore, it should be resolved by getting and considering more facts. It is much easier to reach agreement, however, if standards are recognized for their educational value, and as marking acceptable quality levels, rather than as mandates to be slavishly followed. By publishing standards in proposed or trial form for extended consideration before they take full effect, the attainment of lasting and satisfactory standards is often expedited.

III. Are Standards Accepted—Do Standards Pay?

Standards that have a good basic reason for their use are adopted without question. Many simple standards learned from childhood are followed and accepted as fact. In the industrial field standards have been accepted, not only for manufacturing but also for purchasing, because every manufacturer is a large purchaser of materials he does not make. Would Ford, Detroit Edison, Eastman Kodak, General Electric, General Motors, Radio Corporation of America, Standard Oil, Westinghouse, and many others establish standards for their own use if they did not believe in them?

Our Federal Government uses a specification—a standard—to purchase a required article, whether it be a cake of soap, a radio, an airplane, or a tank.

Standards are accepted because standards pay good dividends in a smoothly running organization, increased production, better quality, and decreased cost.

IV. The Trend of Standardization

The standardization movement after the War will depend on how well we observe and are guided by past and present experience. The lack of standards along certain lines has been a manifest handicap, but the war has given a great impetus to standards development, especially in the metals industries. On the other hand, standards activities in the consumers' goods field have been comparatively dormant.

The postwar standards program should, therefore, capitalize the war progress and apply it to consumers' goods generally. In forming this program, it is important to build on experience. Previous to World War I, it may be said that there was no unified effort to produce standards national in character, nor to attempt representation of all interests in developing

[3] "Making Democracy Work" by Howard Coonley, *Electrical Engineering,* July, 1941.

particular standards. Although standards had reached a comparatively advanced stage in some fields, this progress was due to a few far-seeing individuals, and even related standards projects were carried forward without correlation.

World War I showed in a striking way the handicaps due to non-interchangeable parts. It gave the prime incentive, therefore, for the formation of the American Engineering Standards Committee, later broadened in scope and called the American Standards Association.

The present highly mechanized war has multiplied many fold the problems of interchangeable parts and has shown the value of standardizing materials, processes, and finishes, as well as dimensions. Decentralized manufacture, whereby many small plants contribute parts to a complete equipment, has brought forcibly to our attention the advantages, even the necessity, of better standards. Will we allow this impetus to dwindle after the war, or will we use it to create standards of value in peacetime activities? Certainly the comparative inactivity in consumers' goods standards, together with the astonishing number of new materials and products developed for war purposes, will provide unusual opportunities for post-war standardization.

It is axiomatic that standardization follows rather than leads practice. How could earlier standards have helped, or possibly would they have hindered, the new developments brought about by military methods? True, many new practices could not be foreseen, certainly not in the detail necessary for standards. Nevertheless, standards for materials, processess, and tests that are common to many different programs, all simplify and speed up production, so they are of equal benefit for peace- and war-time production. If more such standards had been ready in advance, the effort we expended in war conversion would have been to this extent available for new and speedier developments.

The trend of progress set in motion by our war experience, therefore, suggests that we develop:

1. Improved specifications, establishing the desired attributes of each product, without restricting the methods used in attaining the result.
Thus inventions may be encouraged and evaluated.

2. Improved standards for basic materials, so that properties may be more completely defined and more closely maintained.

3. Improved standards of size, providing preferred number steps of dimensions; and thus reducing the number of kinds of one product that must be produced and stocked.

4. Improved standards for production processes, including tolerance requirements; to aid the producer of specialized parts, and facilitate decentralized manufacturing.

5. Improved standards for testing, so that all the attributes of a product may be measured, so leading to improved control of quality.

6. Improved methods of accrediting, packing, and shipping; so that products may be more widely distributed. Thus American quality products may aid abroad as well as at home in raising the standards of living.

Shall We Go Forward?

At present and during the war, standardization is in demand. Hundreds are working on American Standards. Will we lose interest after the peace or shall we continue to develop new and better standards? In 25 years about 600 American Standards, mostly industrial, have been issued. There should be five or ten times as many. Thousands of men are available for this work. They have the interest and are willing to cooperate and merge their ideas and experience. We have the machinery for producing American Standards in the American Standards Association. It is up to management to see that American Standards go forward.

Post-War Standards For Consumer Goods

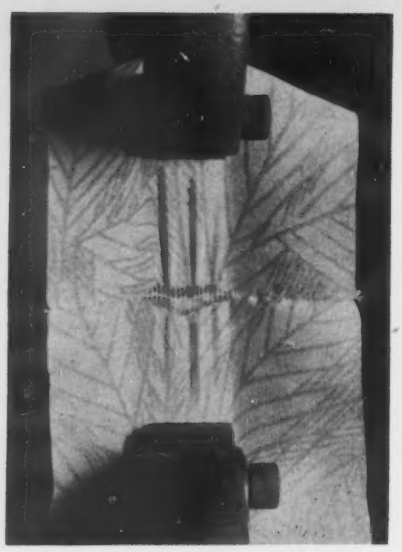
by Irwin D. Wolf[1]

Chairman, ASA Advisory Committee on Ultimate Consumer Goods

THE post-war period will offer a tremendous challenge to American industry in the opportunity for re-evaluation of present standards and development of additional minimum standards of quality for a vast amount of consumer goods. In some goods of staple nature, a series of standards of progressive severity will be useful both to industry and to the public. The American Standards Association through its Advisory Committee on Ultimate Consumer Goods must be an active, vital leader in this program.

Not the least important lesson taught industry by the war—that most heartless and stern teacher—was the fact that our program of standards for consumer goods was hopelessly inadequate. A sound consumer goods standards program must mean more than a list of specifications that in times of emergency cannot be carried through into goods of the required quality. Since Pearl Harbor, goods of specified quality standards have disappeared entirely from some price lines, especially in textile products. Many stores' own brand products, the quality of which was specified by standards, have disappeared from the shelves for the dur-

[1] Vice-president, Kaufmann Department Store, Pittsburgh, Pa.



Now is the time to appraise test methods for consumer goods for post-war use.

ation. There are sound reasons for this shortage of goods; but we are concerned now with the post-war picture, as we look ahead to the next 25 years of ASA activity.

Today is a good time for the Advisory Committee on Ultimate Consumer Goods to appraise for post-war use the test methods on which consumer goods standards are based and which are used in our government, school, commercial, industrial, and retail-store laboratories. These test methods must be studied and coordinated, because they are the tools of measurement, the standards, by means of which consumer goods standards are set. A project for the purpose of studying such tests has a high priority rating in the program of the ACUCG. In the evaluation of textile products, in particular, a scientific study must be made of the test methods actually used in our laboratories. The technical societies have done a noteworthy job in standardizing many of these methods but they would be the first to agree that these standards are constantly being changed and increased in accuracy and severity. Some causes of service failure do not even yet have universally accepted standards of measurement. We do not know how to duplicate in a machine, for example, the effect of wear or rubbing of a suit, the initiation of a tear in a boy's overall, the snagging of a stocking. Much research remains to be done as a basis for developing and standardizing the tools of measurement by means of which such failures can be controlled.

Dictionary of Trade Terms Needed

Another project of the ACUCG that has tremendous importance to the post-war consumer is a dictionary of trade terms. For the best post-war relation between all groups a common understanding must be arrived at for the descriptive terms used by the manufacturer, distributor, and consumer of textile products, electrical appliances, furniture, pharmaceuticals, and all other kinds of consumer goods. We have many specialized vocabularies, not the least confusing being that of our own technologists. To eliminate misunderstandings, the description of goods and the labeling as to performance must be so written as to be understood by everyone interested in the product.

No one knows what effect our wartime researches and the tremendous production facilities will have on our civilian goods when peace comes again. Of one thing we may be sure, changes will be made in many of our labor-saving household appliances, building materials, clothing fabrics, and even in our foods. Possibly many of our pre-war standards of quality will have to be cast aside within a year or two and be replaced by others more rigid and demanding a higher degree of performance than we have ever had before.

Existing consumer goods standards will offer a guide to manufacturers re-tooling from tanks to automobiles, from parachutes to lingerie, from sandbagging to carpets, or from machine guns to typewriters.

Standards Offer Challenge

The gradual development of new standards to utilize most fully the new knowledge of materials born out of the war will offer a challenge to manufacturer, technologist, and distributor. The challenge will be to incorporate in the product the new material or combination of materials best suited to the purpose, to give it increased efficiency and serviceability, to make it pleasing to the eye, to produce and distribute it at a reasonable price, and to present the facts adequately and truthfully.

Standards will also be a guide and a surety to the consumer. Simple standards answer the questions "How big is it?" or "Will the color be fast to washing?" More complex standards will be required to determine and to describe serviceability, performance efficiency, and durability, but these facts will be wanted by the user of the machine, material, or article of clothing as purchasing guides.

Minimum standards are essential in all kinds of consumer goods. Against these standards will be measured the blended fiber cloths, the improved textile finishes, the new dye stuffs, the post-war automobiles, the synthetic rubber girdles, the war-improved radios, and other consumer goods.

Above these minima must be other standards to tell us the answer to the question, "How much better is it?" Here we come to the application of the ACUCG study of test methods, and of the description of a commodity. Performance criteria for products superior to a minimum serviceability standard must be left flexible so as to encourage research and development toward an ever better product. As the qualities of the best are increased, the better may be sold at a lower price, and the minimum standard may be raised so as to drop the poorer or barely minimum product off the market. Some staple products, such as electrical appliances, tools, bed sheets, towels, and similar articles of wide usage, may permit standards for several grades. It would be a mistake even here, however, to set the performance requirements so rigidly as to discourage research designed to produce a superior product within any grade level and to prevent the description of this superiority in the sale of the article.

Improvements result from the incentive to produce an article so good that it has a repeat sale value. They do not come from manufacturing goods designed to meet a minimum standard. We must regard our minimum standards as being the simplest of our tools—our yard-sticks. Our post-war standards will be the delicate tools of measurement to tell us how much better one article is than another for a given use or purpose.

Certification of Consumer Goods—ASA Project of the Future

by Bernard L. Oser[1]

Chairman, ASA Sectional Committee on Valid Certification

THOUGH the original need for standardization may have resulted from the growing complexity of sizes and designs of manufacturing parts and the consequent need for simplification and interchangeability, an increasingly important aspect of standardization now relates to the definition of identity, quality, durability, performance—features which define what the purchaser is getting for his money. Price and quality are as closely interwoven as time and space, and the terms are significant only when considered in relation to each other.

Industry Standards Point Way

The development, promulgation, and application of standards by American industry constitute a grand tribute to the possibilities of voluntary cooperative action. The part played by the American Standards Association and collaborating organizations is well known to most readers of this magazine. As a result standardization has now attained such acceptance that the industrial or institutional purchasing agent who does not buy on specification, where specifications exist, is not worth his salt. The largest buyer in the country, the United States Government, has established a collection of some 1,600 Federal Specifications which stand as the prototype of what can be done not only in the industrial field but also in the consumer field. These specifications, together with the standards for foods and drugs found in the official compendia, such as the U. S. Pharmacopoeia and the National Formulary, and in the standards and definitions under the Federal Food, Drug, and Cosmetic Act, constitute the most comprehensive collection of standards for consumer goods available in the country today.

In this connection it is worth noting that the promulgation of standards for consumer goods has been left almost entirely to various agencies of the Federal Government, whereas the formulation and adoption of industrial standards have been largely under the aegis of trade and technical associations. Diverse organizations such as the American Petroleum Institute, the National Lumber Manufacturers Association, the National Cottonseed Products Association, the Society of Automotive Engineers, and scores of others have been very active in developing industrial standards. The scientific or technical associations, such as the American Chemical Society, the American Society for Testing Materials, the American Oil Chemists Society, and the Association of Official Agricultural Chemists have also played an important role in the development either of industrial specifications or of testing methods to determine conformity thereto.

Although examples may be cited of the development of standards for consumer commodities by voluntary action on the part of the industries concerned, generally speaking, manufacturers and distributors of food, clothing, and home appliances have been slow to specify, much less to standardize, the identity and quality of the goods they sell.

Growing interest of consumers in standards for consumer goods and the increasing regulation of quality by definition on the part of governmental agencies are signposts that industry would do well to read carefully. The trend is unmistakably from *caveat emptor* to *caveat vendor*. A Supreme Court Justice has been quoted previously in these pages[2] as saying, "It is too often overlooked that government as a rule undertakes no services or regulations except after private agencies have proved themselves incapable or unwilling."

Industry Inaction Fosters Government Action

The slowness of manufacturers and distributors to recognize the importance of specifications and standards for consumer goods has resulted in a tremendous growth of the consumer movement in recent years and in the intervention of the government in matters of grading and control of such commodities. The Federal

Standard principles for certification of consumer goods tested by independent laboratories are being studied by ASA committee.

[1] Director, Food Research Laboratories, Inc.

[2] "The Role of Standards in the System of Free Enterprise," by Howard Coonley and P. G. Agnew, April, 1941, Part 2.

Specifications Executive Committee, which has responsibility for the Federal Specifications, and the purchasing agencies of the Army and Navy are concerned principally with purchases made by and for various branches of the Federal Government. Specifications under which such branches operate cover not only industrial products but consumer goods as well. Other governmental or quasi-governmental agencies are also authorized or required by statute to establish standards covering not only governmental purchases but also private transactions in interstate commerce. These are the U. S. Pharmacopoeial Convention, Inc., the American Pharmaceutical Association, the Bureau of Animal Industry, the Food and Drug Administration, the Bureau of Agricultural Economics, the Public Health Service, as well as a multitude of state and local departments of health, buildings, safety, etc. In addition there are other special groups whose principal or collateral function has been to promulgate standards, conformity to which may be a voluntary matter or, in some cases, a prerequisite to advertising in certain publications. Among these may be mentioned the American Medical Association, the American Dental Association, the American Association of Medical Milk Commission, the Commission on the Standardization of Biological Stains, the American Gas Association, the Underwriters Laboratories.

No Established System

Despite the great headway that has been made in the field of standardization, there is no established system or practice governing the *modus operandi* of commercial transactions involving specifications, either in industrial channels or at the consumer level of distribution. Where specifications exist, transactions may be based on the warrantee, expressed or implied, of the vendor that the offered goods conform to such specifications. Often, however, the purchaser merely accepts this assurance without any attempt at independent verification.

More astute purchasing agents not only buy according to specifications, however, but also authorize payment only on the basis of tests of samples or deliveries, or both, for compliance. Large industries, as well as governmental and other institutional organizations, maintain physical and chemical control laboratories for this purpose. One of the functions of the National Bureau of Standards, for example, as well as certain other scientific bureaus is to serve as a testing laboratory for various procurement branches of the government. The Bureau of Agricultural Economics maintains a public grading service for inspection and grading of agricultural commodities in the field or at points of distribution. Goods sold to the United States Army or Navy must conform to the specifications established by these respective services. A certificate of approval is granted for passing the tests, and successful bidders must have certificates of approval before their bids may be considered.

Laboratories Guard Independence

Because of this growing reliance on approval tests and certificates, an ever-expanding activity of commercial laboratories is collaboration in the development of standards and specifications and the testing of commodities for conformity to specifications. Reputable laboratories guard their independence very zealously, for it is this impartiality which places them in an excellent position to serve both vendor and vendee, manufacturer and consumer.

Consumer Cannot Test Purchases

A sharp distinction must be drawn, however, in the use of commercial or industrial standards as compared with consumer goods standards. An industrial purchaser may be assumed to have available technical knowledge and facilities with which to interpret specifications and to conduct tests to establish conformity. The dollar volume of his purchases usually justifies the cost of tests. On the other hand, the consumer, generally speaking, lacks technical knowledge, testing facilities, or financial justification for checking small, individual purchases, and is therefore at the mercy of the manufacturer or dealer.

Thus, much attention has been focused of late on merchandise labeling for consumer information, and more specifically on grade labeling as compared to informative labeling. Grade labeling would indicate by such simple designations as A, B, C, the relative qualities of merchandise as determined by specifications and tests. It is contended that such labeling would relieve the consumer of the necessity for acquiring the technical knowledge without which complete understanding of so-called informative labeling is impossible. The educational value of the latter, however, can hardly be denied. Its weakness lies in the fact that an informative label may be accurately descriptive and yet offer no basis for comparison between products of better or inferior quality.

In any case, there always remains the question of certification by an independent agency of the validity of the claims made either on the label or in advertising. At one extreme we have the endorsement of "experts" who enjoy the freedom of the air, and at the other we have "valid certification," that is, determination by an independent agency of whether a product conforms to established specifications. Some magazines, newspapers, and self-appointed "institutes" have been responsible for the widespread abuse of seals or stamps of approval or of words like "recommended," "approved," "guaranteed," which upon examination of the limiting qualifications are often meaningless and obscure.

Enforcement Agencies Protect Public

It is the weakness on the part of the public, to accept rather than attempt to evaluate labels, that accounts for the enforcement agencies' frequent zeal in going beyond the printed word to establish whether misbranding exists.

More significance might be attached to such terms as "tested and approved," "verified," "certified," if they more frequently indicated conformity to standards established on the basis of objective criteria and independent tests.

Recognizing the salubrious effect of a system of valid certification for both industrial and consumer goods, the American Standards Association has organized a committee to study this problem and to propose a recommended practice for consideration by all interested parties. Participating in the work of this committee are representatives of trade associations, purchasing agents, consumer organizations, independent

laboratories, the Federal Trade Commission, and other governmental agencies. The committee has prepared and is considering a proposed American Standard Practice in public approval and certification procedures. This basic document would outline the procedure which any nationally recognized organization should follow in certifying or similarly endorsing a commodity or service. It is hoped that the ultimate adoption of such a standard practice for valid certification may lead to further development and adoption or promulgation of standards for all sorts of consumer goods so that the use of some symbol signifying valid certification will come to have a real meaning to the consumer. Such a system would be predicated upon the existence of specifications available for public inspection and would provide for independent sampling and adequate and frequent testing.

Here is an opportunity for American industry, through voluntary cooperative effort and by self-policing, to render a service to itself and the public alike, and by so doing forestall a similar activity on the part of the government through legislative intervention.

Safety Equipment Stocks Dependent on War Needs

Extraordinary attention has been focused on the so-called "personal factor" in accident prevention programs, but not enough on safety equipment, declared H. C. Mesch, chief of the Safety Equipment Section of the War Production Board, at the National Safety Congress in Chicago October 6. It has been demonstrated beyond doubt that accident prevention programs not only are economical but also are indispensable in maintaining war production schedules, he stated.

It is not so easy during war-time to keep up the stocks of essential safety equipment, however, since military requests often upset normal industry schedules and create shortages, he explained.

"For example, for some months prior to the invasion of North Africa, the Army perforce drained the supply of industrial respirators. Chemical Warfare Service personnel got in touch with all known manufacturers of industrial respirators and placed orders with the highest possible ratings. It was, of course, necessary and desirable that the Army should have first call on these respirators. Yet, you can readily see that it was impossible for us, under the circumstances, to advise you, the consumer of respirators who clamored for delivery, the reason for the temporary shortage. Another example is the shortage of industrial goggles which has been plaguing everyone concerned with industrial eye protection. One of the principal reasons for this shortage is the fact that the Army and Navy has exerted a heavy demand on goggle production facilities because of their urgent need for aviation goggles, tank goggles, ski goggles, eye shields, and sun glasses.

"Still another example is the case of oxygen breathing apparatus in very large quantities, many times more than was ever produced before the War. It has been extremely difficult for the manufacturer of this apparatus to meet all the urgent needs of the Services as well as the requirements from industry. These examples will, I hope, explain in part why deliveries of some items of safety equipment have been relatively slow. In saying this, I trust you believe, as I do, that military needs of this character should receive the highest priority."

ASTM Organizes New Hydrocarbons Committee

A new committee on Industrial Aromatic Hydrocarbons of the American Society for Testing Materials held its organization meeting at New York October 26. The new committee, which will be known as ASTM Committee D-16, was organized to develop standard methods of tests, definitions, and specifications for aromatic hydrocarbons and related products which boil below 400 F. Products covered by the work of the committee will include various grades of benzene, toluene, xylene, solvent naptha, and other light oil products.

Temporary officers, to serve until June, 1944, have been appointed. J. M. Weiss, consulting chemical engineer, New York, is temporary chairman; R. P. Anderson, secretary of the Division of Refining, American Petroleum Institute, is temporary secretary; and C. A. Lunn, process engineer, Consolidated Edison Company, New York, is temporary vice-chairman.

The first four subcommittees to carry on detailed work involving research and actual drafting of the standards have already been authorized for crude aromatic products, refined aromatic products, chemicals, and aromatic solvents.

Rodgers Recommends Standards For Motor Truck Parts

Standardization of motor truck parts and units was recommended recently by Ted V. Rodgers, president of the American Trucking Associations, Inc., in order to increase the operating efficiency of the motor truck transportation system. Mr. Rodgers told members of his association that while the standardization of equipment does not of necessity imply that each vehicle must be like others in all details it would make it possible to use available power units on any type of trailer.

"If various types of vehicles were interchangeable in emergencies, or even in normal operations, the contribution to flexibility of performance would be important," Mr. Rodgers declared.

Index

The Index for the year 1943 (Volume 14) of INDUSTRIAL STANDARDIZATION will be published in connection with the January 1944 issue.

British Mission and American Groups Confer on Screw Thread Standards

Reach agreements on coordination of screw thread practices for inter-Allied war production and post-war use

A SERIES of technical conferences on screw thread standards was held in New York from November 23 through December 4, 1943, attended by the members of a British mission on screw threads and by American and Canadian technical experts. The conferences were held under the auspices of the Combined Conservation Committee which includes representatives of the United States and the United Kingdom.

The conferences reached a number of agreements on specific screw thread standardization problems which it is hoped will lead to the unification of British and American practices in the production of threaded parts for war purposes.

In addition to these specific problems, representatives of the American Standards Association, the British Standards Institution, and the Canadian Engineering Standards Association considered the general problem of unification of the British Whitworth thread system and the American Standard thread system. It was agreed to organize committees in the three countries to study the unification problem. It is expected that this step may lead to a general international program of screw thread unification, a problem of great importance to the post-war development of industry.

Subjects Considered

The subjects considered by the conferences held under the auspices of the Combined Conservation Committee were:

- Truncated Screw Threads of Whitworth Form
- Pipe Threads
- Gas Cylinder Threads
- Hose Coupling Threads for Ships
- Acme Threads
- Buttress Threads
- High-Duty Studs for Non-Ferrous Castings
- Production, Measurement, and Gaging of Screw Threads
- Cylindrical Fits

Under the auspices of the American Standards Association a conference between the British mission and some 30 American and Canadian experts was held to discuss the possibility of unifying the British Standard Whitworth threads and the American Standard threads.

The detailed preparations for the several conferences were taken care of by the American Standards Association. Dr. John Gaillard, ASA Mechanical Engineer, acted as technical secretary.

Truncated Whitworth Threads

The British mission and the American representatives agreed that unification of the essential features of the truncated Whitworth threads adopted by the British and of those now being developed by an ASA War Committee is highly desirable. This unification, which will be of particular value to American production for lend-lease purposes, will involve a change in the British Standard for Whitworth threads. The British representatives declared that upon their return home they would propose that this change be considered. It was also agreed that truncated British Standard straight pipe threads should be added to the proposed American War Standard.

American and Canadian manufacturers using truncated Whitworth threads are having difficulties when their product is checked by British inspectors, it was reported. The British practice is to gage the product in such a way that bolts with threads truncated below the basic major diameter are rejected, regardless of whether the truncation is in accordance with the British Standard or with the proposed American War Standard. The British mission explained that this method of inspection is based on traditional practice of long standing in the British War Office. They said that they would bring these difficulties to the attention of the British authorities in an effort to have the method of inspection changed.

Valve Threads for Gas Cylinders

The threads on valves used on compressed gas cylinders offer a special problem which was considered by the British and American delegates. The problem concerns the thread on the stem of the valve which must fit the thread in the neck of the cylinder, and also the thread on the outlet of the valve which must connect the valve to the equipment using the gas or to the equipment which refills the cylinder. Both valve threads differ in Great Britain and the United States, and consequently many valves are being thrown away as useless in the field because British and American threads are not interchangeable. The most important of the two threads is that on the valve outlet, it was agreed, because its interchangeability is vital to effective service in the field. Without such interchangeability, British armed forces cannot readily use gas contained in American cylinders, and vice versa. It was agreed, therefore, that consideration will be given in Great Britain and the United States to the development of standard adapters for the outlet of valves, beginning with those used for oxygen, carbon

dioxide, acetylene, hydrogen, nitrogen, and chlorine. Such adapters will make it possible to connect cylinders of American origin with British equipment (either for using the gas or for refilling the cylinders), and conversely.

Acme, Buttress, and Stud Threads

The proposed American War Standard for Acme Screw Threads for Special Purposes now being developed in the United States was discussed. This project may require a revision of the American Standard for Acme and Other Translating Threads (B1.3-1941), which applies to Acme threads for general purposes. Because the British have taken over this American Standard, the subject was of particular interest to the mission. The British delegates agreed with the recommendation recently made by the ASA War Committee that the general-purpose and the special-purpose Acme threads be merged into a single series and that the fits on pitch diameter between screw and nut be established on the basic nut principle. Furthermore, it was agreed that in cases where a centralizing fit is required, it should be established on the major diameter.

Although no standard for buttress threads has been set up either in Great Britain or the United States, the adoption of a standard pressure angle would be useful, it was decided, and it was recommended that this matter be studied in both countries.

A discussion of threads on high-duty studs for nonferrous castings (particularly aluminum and magnesium) yielded interesting data on British and American practices. While it does not seem possible to set up a common standard at this time, continued exchange of experience was deemed advantageous.

Inter-Allied Unification

At the special conference on unification of British Standard Whitworth and American Standard threads, held under the auspices of the American Standards Association, the following motion, proposed by a Canadian delegate and seconded by a British and an American delegate, was unanimously adopted:

"That in the opinion of this conference it is desirable to examine the possibilities of inter-Allied screw thread standardization by setting up groups to study this problem in each of the three countries represented at this meeting (Great Britain, Canada, United States), and

"That the representatives of these three countries should keep in touch with each other with a view to holding another conference at an early date on this subject among themselves and also to prepare for holding a conference or conferences with other Allied Nations at the proper time."

Interchangeable threads on valves of British and American compressed gas cylinders are needed to make gas readily available in the field.

Cylindrical Fits

In a conference on Cylindrical Fits, the British and American standards on this subject were briefly reviewed. The British mission was also informed about recent proposals for the development of an American War Standard intended as a revision of the Tentative American Standard on Cylindrical Fits of 1925, to be supplemented by gaging specifications. The British Mission also visited the Army Ordnance Gage Laboratory in Philadelphia and on that occasion discussed the manufacture and use of glass gages.

United Nations Standards Committee

In addition to the technical conferences, representatives of the British Standards Institution, the Canadian Engineering Standards Association, and the American Standards Association held conferences which led to the participation of the American Standards Association in the organization of a United Nations Standards Committee (see page 335).

Members of the British mission included Percy Good, C.B.E., Technical Advisor to the British Ministry of Supply, and Director of the British Standards Institution; Stanley J. Harley, Controller of Jigs, Tools, and Gages, Machine Tool Control, Ministry of Supply, and Managing Director of the Coventry Gauge and Tool Company; and Francis W. Elstub, Technical Advisor to the Ministry of Supply and connected with the firm of Alfred Herbert, Ltd., Coventry, England.

Members of the subcommittee of the Combined Conservation Committee which made the arrangements for the meetings are: Howard Coonley, director of the WPB Conservation Division, *chairman;* R. R. Allwork, executive officer, Combined Conservation Committee; H. W. Bearce, National Bureau of Standards; Colonel H. B. Hambleton, Army Ordnance Department; A. M. Houser, WPB Conservation Division; F. E. Richardson, Aeronautical Board; K. D. Williams, U. S. Bureau of Ships; and P. G. Agnew, American Standards Association.

Chairmen of the several meetings held under the auspices of the Combined Conservation Committee were: Colonel Harry B. Hambleton (Truncated Screw Threads of Whitworth Form); Alten S. Miller (Pipe Threads; Gas Cylinder Threads; Hose Coupling Threads for Ships); Paul J. DesJardins (Acme Threads; Buttress Threads; High-Duty Studs for Non-Ferrous Castings); Ralph E. Flanders (Production, Measurement, and Gaging of Screw Threads); H. W. Bearce (Cylindrical Fits).

Ralph E. Flanders also acted as chairman at the conference on unification of British Whitworth and American Standard threads.

ASA Standards Activities

American Standards

Standards Available Since Our November Issue

Circular and Dovetailed Forming Tool Blanks. American Standard B5.7-1943 50¢

Ferrous Plugs, Bushings, Locknuts, and Caps with Pipe Threads American Standard B16.14-1943 40¢

Jacks, Safety Code for American Standard B30.1-1943 30¢

Machine Tapers, Self-Holding Taper Series American Standard B5.7-1936 60¢

Photography

Dimensions of Photographic Papers—Inch Width Rolls American Standard Z38.1.5-1943 10¢

Dimensions of Photographic Papers—Centimeter Size Sheets and Rolls American Standard Z38.1.6-1943 10¢

Dimensions for Amateur Roll Film, Backing Paper, and Film Spools American Standard Z38.1.7—Z38.1.24-1943 50¢

Photographic Speed and Speed Number, Method of Determining American Standard Z38.2.1-1943 25¢

Standards Approved Since Our November Issue

Basic Carbonate White Lead (Revision of K23-1941) American Standard K23-1943

Carbon-Silicon Steel Plates of Ordinary Tensile Ranges for Fusion-Welded Boilers and Other Pressure Vessels (Revision of G31.1-1942) American Standard G31.1-1943

Chrome Yellow (Revision of K27-1941) American Standard K27-1943

Electrolytic Copper Wire Bars, Cakes, Slabs, Billets, Ingots and Ingot Bars (Revision of H17.2-1942) American Standard H17.2-1943

Industrial Control Apparatus (Revision of C19-1928) American Standard C19.1-1943

Low Tensile Strength Carbon-Steel Plates of Flange and Firebox Qualities (Revision of G30.1-1942) American Standard G30.1-1943

Spindle Noses and Arbors for Milling Machines American Standard B5.18-1943

Tool Shanks and Tool Posts for Lathes, Planers, Shapers, Boring Mills, and Turret Lathes (Revision of B5b-1929) American Standard B5.2-1943

Standards Being Considered by ASA for Approval

Allowable Concentration of Oxides of Nitrogen Z37.13

Basic Sulfate White Lead (ASTM D82-42T) Revision of American Standard K7-1941

Building Code Requirements for Administration A55.1

Building Code Requirements for Masonry A41.1

Chemical Analysis of Alloys of Lead, Tin, Antimony and Copper (ASTM B18-36T) Revision of American Standard K5-1922

Copper-Base Alloy Forging Rods, Bars and Shapes (ASTM B124-42T) Revision of American Tentative Standard H7-1939

Low Tensile Strength Carbon Steel Plates for Structural Quality for Welding Revision of American Standard G40.1-1942

Standards Submitted to ASA Since Our November Issue

Laminated Phenolic Products Standards (NEMA No. 39-57) C59.16

Machining and Punching of Laminated Phenolic Plate, Practice for (NEMA No. 39-58) C59.17

Photography

Dimensions for Industrial X-ray Sheet Film Z38.1.T1

Dimensions for Graphic Arts Sheet Film Z38.1.T2

Dimensions for Medical X-ray Sheet Film (Inch and Centimeter Sizes) Z38.1.T3

Dimensions for Professional Portrait and Commercial Sheet Film (Inch Sizes) Z38.1.T4

Dimensions for Professional Portrait and Commercial Sheet Film (Centimeter Sizes) Z38.1.T6

Dimensions for Photographic Dry Plates (Inch Sizes) Z38.1.V1

Dimensions for Photographic Dry Plates (Centimeter Sizes) Z38.1.V2

Rotation, Connections, and Terminal Markings for Electrical Apparatus Revision of American Standard C6-1938 C6.1

Testing Molded Materials Used for Electrical Insulation (ASTM D48-42T) Revision of American Standard C59.1-1943

Testing Sheet and Plate Materials Used in Electrical Insulation (ASTM D229-42) Revision of American Standard C59.13-1943

Testing Shellac Used for Electrical Insulation (ASTM D411-42) C59.18

American War Standards

War Standards Approved and Published Since Our November Issue

Dry Electrolytic Capacitors (Home Receiver Replacement Type) Second Edition C16.7-1943 20¢

Glass Radio Insulators C75.8-1943 50¢

War Standards Approved and Published

Accuracy of Engine Lathes B5.16-1941 25¢

Allowable Concentrations of Toxic Dusts and Gases Z37

Cadmium Z37.5-1941 20¢

Manganese Z37.6-1942 20¢

Metallic Arsenic and Arsenic Trioxide Z37.9-1943 20¢

Xylene Z37.10-1943 20¢

Code for Electricity Meters (Revision of Paragraph 827) C12WS-1942 10¢

Color, Specification and Description of Z44-1942 25¢

Domestic Gas Ranges, Approval Requirements Z21.1ES-1942 $1.00

Electrical Measuring Instruments C39

Electrical Indicating Instruments (2½- and 3½-Inch, Round, Flush-Mounting, Panel-Type) C39.2-1943

War Standards Approved—(Continued)

Shock-Testing Mechanism for Electrical Indicating Instruments (2½- and 3½-Inch, Round, Flush-Mounting, Panel-Type) C39.3-1943

Dimensions for External Radio-Frequency Thermocouple Converters (120 Milliamperes to 10 Amperes, Inclusive) C39.4-1943

Gas Water Heaters, Approval Requirements Z21.10WS-1942 $1.00

Machine Tool Electrical Standards C74-1942 40¢

Military Radio Equipment and Parts C75

Ceramic Radio Insulating Materials, Class L C75.1-1943 20¢

Ceramic Radio Dielectric Materials, Class H C75.4-1943 20¢

External Meter Resistors (Ferrule Terminal Styles) C75.5-1943 25¢

Fixed Composition Resistors C75.7-1943 60¢

Fixed Mica-Dielectric Capacitors C75.3-1943 50¢

Glass Radio Insulators C75.8-1943 50¢

Glass-Bonded Mica Radio Insulators C75.6-1943 25¢

Steatite Radio Insulators C75.2-1943 50¢

War Standards Approved—(Continued)

Photographic Exposure Computer Z38.2.2-1942 $1.00

Pressure Ratings for Cast-Iron Pipe Flanges and Flanged Fittings, Class 125 B16a1-1943 10¢

Pressure-Temperature Ratings for Steel Pipe Flanges, Flanged Fittings and Valves (Revision of Tables 6 to 11 inclusive, American Standard B16e-1939) B16e5-1943 25¢

Protective Lighting for Industrial Properties A85-1942 50¢

Quality Control
- Guide for Quality Control Z1.1-1941
- Control Chart Method of Analyzing Data Z1.2-1941
- Control Chart Method of Controlling Quality During Production Z1.3-1942 75¢

(In one Volume 75¢)

Protective Occupational Footwear Z41
- Men's Safety-Toe Shoes Z41.1-1943 (2nd edition)
- Men's Conductive Shoes Z41.3-1943
- Men's Explosives-Operations (Non-sparking) Shoes Z41.4-1943 (2nd edition)
- Men's Electrical-Hazards Shoes Z41.5-1943 (3rd edition)
- Men's Foundry (Molders) Shoes Z41.6-1943 (3rd edition)
- Women's Safety-Toe (Oxford) Shoes Z41.2-1943 (3rd edition)
- Women's Safety-Toe (High) Shoes Z41.7-1943 (2nd edition)
- Women's Explosives-Operations (Non-sparking) Shoes Z41.8-1943 (2nd edition)
- Women's Conductive Shoes Z41.9-1943 (2nd edition)

(In one Volume 40¢) (In one Volume 40¢)

Replacement Parts for Civilian Radio C16
- Dry Electrolytic Capacitors (Home Receiver Replacement Type) C16.7-1943 20¢
- Fixed Paper-Dielectric Capacitors (Home Receiver Replacement Type) C16.6-1943 20¢
- Home Radio Replacement Parts, Simplified List C16.8-1943 20¢
- Power and Audio Transformers and Reactors (Home Receiver Replacement Type) C16.9-1943 25¢

Straight Screw Threads for High-Temperature Bolting B1.4-1942 25¢

War Standards Under Way

Allowable Concentrations of Toxic Dusts and Gases Z37
- Styrene Monomer

Color Code for Lubrication of Machinery Z47

War Standards Under Way—(Continued)

Cylindrical Fits B4

Electrical Indicating Instruments C39
- External Ammeter Shunts for Panel-Type Instruments C39.5

Machine Tool Electrical Standards Revision of C74-1942

Military Radio Equipment and Parts C75
- Capacitors
  - Fixed Ceramic-Dielectric Capacitors C75/553*
  - Paper-Dielectric Capacitors
- Crystals
  - Crystal Unit CR-1( )/AR C75/562*
- Dynamotors C75/580*
- Insulating Materials
  - Porcelain Radio Insulators C75/579*
- Resistors
  - Power-Type Wire-Wound Rheostats C75/590*
  - Variable Wire-Wound Resistors (Low Operating Temperature) C75/574
- Toggle Switches C75/576*

Packages for Electronic Tubes Z45

Photography and Cinematography Z52

Protective Occupational (Safety) Clothing Z51
- Leather Aprons (Z51.1)
- Leather Cape Sleeves (with or without Bibs) Z51.2
- Leather Leggings (Knee Length) Z51.3
- Leather Welding Coats Z51.4
- Leather Overalls Z51.5
- Sleeves Z51.6
- Leather Gauntlet Gloves Z51
- Coated or Impregnated Textile Aprons (for Protection against Corrosive Material)

Replacement Parts for Civilian Radio C16
- Volume Controls (Home Receiver Replacement Type) C16/107*

Resistance Welding Equipment, Specifications for Design and Construction C52

Safety in Electric and Gas Welding and Cutting Operations Z49

Screw Threads B1
- Acme Screw Threads for Special Purposes B1.5
- Truncated Whitworth Screw Form B1.6

Welding Arc Hand Shield and Helmets Z2

Women's Industrial Clothing L17
- Dresses L17.1 and L17.4
- Slacks, Overalls, and Coveralls L17.2
- Jackets, Shirts, and Aprons L17.3

* Printed draft is available

News of ASA Projects

Allowable Concentrations of Toxic Dusts and Gases Z37

The committee has decided to develop standards for the allowable concentration of acrylonitrile; fluorine; fluorides; hydrofluoric acid; methyl chloride; radium dust, radon gas in expired air and workroom air, gamma ray exposure; and silica.

Trichloroethylene—A draft standard has been proposed by the chairman of the subcommittee and submitted to the subcommittee for consideration.

Oxides of Nitrogen (Z37.13)—A proposed standard is now before the Standards Council for final approval.

Clothing, Protective Occupational (Safety) Z51

Three draft standards, originally prepared only for women's clothing, have been redrafted to include protective clothing for men. They have been sent to canvass and are now out to letter ballot for approval. At the meeting of this War Committee October 4 and 5, three additional standards on leather garments were drafted and will be ready soon for canvass.

Coordination of Dimensions of Building Materials and Equipment A62

Recently, ASA Committee A62 prepared a proposed draft standard which is being widely circulated among designers, manufacturers, contractors, and others interested in the building industry. This proposed standard provides a basis for coordination of dimensions of building plans and detail with material and equipment having standard coordinated dimensions. It sets up as a basic unit a standard module of 4 inches. Committee A62 is now actively engaged in the preparation of further standards which will expand the program and provide standards for coordination of materials and equipment. Copies of Proposed American Standard Basis for Coordination of Dimensions of Building Material and Equipment (A62.1) are available to interested groups for comment and criticism upon request.

Design and Construction of Resistance Welding Equipment C52

The first draft standard to be developed, that on Resistance Welding Electrodes, Electrode Holders, and Seam Welder Bearing Shafts and Bushings (C52/1), has been printed and circulated to interested parties for comment and criticism. The second draft standard, on Welding Machines and Control Apparatus, will be printed shortly and then distributed for comment and criticism.

Safety in Electric and Gas Welding and Cutting Operations Z49

A draft of a proposed War Standard has been prepared by the committee and sent to canvass for criticism. Over 750 copies of this draft have been distributed and the resulting comments are being tabulated and will be given consideration by the committee in the preparation of the final draft.

American Standards

A list of more than 600 American Standards and American War Standards in a wide variety of industrial fields

- Civil Engineering and Construction
- Mechanical Engineering
- Electrical Engineering
- Automotive
- Transportation
- Ferrous Materials and Metallurgy
- Non-Ferrous Materials and Metallurgy
- Rubber
- Chemicals
- Textiles
- Mining
- Wood
- Pulp and Paper
- Miscellaneous

These standards represent in each case general agreement on the part of maker, seller, and user groups as to the best current industrial practice. They are used widely throughout industry and by municipal, state, and federal governments.

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COMMERCIAL STANDARDS MONTHLY } PART 2

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April 1, 1943

American Standards

	Page
Price List of American Standards	2
A—Civil Engineering and Construction	2
B—Mechanical Engineering	3
C—Electrical Engineering	4
D—Automotive	6
E—Transportation	6
G—Ferrous Materials and Metallurgy	6
H—Non-Ferrous Materials and Metallurgy	7
J—Rubber	7
K—Chemical Industry	7
L—Textile Industry	8
M—Mining	8
O—Wood Industry	8
P—Pulp and Paper Industry	8
Z—Miscellaneous	9
Commercial Standards	12
American Safety Standards	12
American War Standards	14
Alphabetical Index to American Standards	15

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A star (*) indicates new and revised standards approved since the last (August 1, 1942) issue of this List

A—Civil Engineering and Construction

		Price
A2.1-1942	*Fire Tests of Building Construction and Materials, Methods of (ASTM C19-41)	.25
A2.2-1942	*Fire Tests of Door Assemblies, Methods of (ASTM C152-41)	.25
A5-1930	Toughness of Rock, Method of Test for (ASTM D3-18)	.25
A6-1925	Drain Tile, Specifications for (ASTM C4-24)	.25
A9.1-1942	Building Exits Code	1.00
A10.1-1939	Manual of Accident Prevention in Construction	2.00
A11-1942	Industrial Lighting	.25
A12-1932	Floor and Wall Openings, Railings and Toe Boards, Safety Code for	.20
A13-1928	Scheme for the Identification of Piping Systems	.50
A14-1935	Construction, Care and Use of Ladders, Safety Code for	.25
A17.1-1937	Safety Code for Elevators, Dumbwaiters, and Escalators, with Supplement A17.3-1942 (Supplement A17.3-1942 sold separately .. 25¢)	1.25
A17.2-1937	Inspection of Elevators (Inspectors' Manual)	.75
A19-1937	Voids in Aggregates for Concrete, Method of Test for (ASTM C30-37)	.25
A21.1-1939	Manual for the Computation of Strength and Thickness of Cast-Iron Pipe	.40
A21.2-1939	Cast-Iron Pit Cast Pipe for Water or Other Liquids, Specifications for	.20
A21.4-1939	Cement Mortar Lining for Cast-Iron Pipe and Fittings, Specifications for	.15
A23-1938	School Lighting	.25
A26-1930	Stone, Slag, Gravel, Sand and Stone Block for Use as Highway Materials, Methods of Sampling (ASTM D75-22)	Under revision
A31-1924	Materials for Cement Grout Filler for Brick and Stone Block Pavements, Specifications for (ASTM D57-20)	.25
A35.1-1941	Manhole Frames and Covers for Subsurface Structures	.35
A37.1-1930	Penetration of Bituminous Materials, Method of Test for (ASTM D5-25)	.25
A37.2-1930	Float Test for Bituminous Materials, Method of (ASTM D139-27)	.25
A37.3-1930	Determination of Bitumen, Method of Test for (ASTM D4-27)	.25
A38-1933	Steel Reinforcing Spirals (R53-32)	.05
A39-1933	Window Cleaning	.20
A40.1-1935	Cast-Iron Soil Pipe and Fittings	.65
A40.2-1936	Brass Fittings for Flared Copper Tubes	.35
A40.3-1941	Soldered-Joint Fittings	.45
A40.4-1942	Air Gaps in Plumbing Systems	In press
A42.1-1942	Gypsum Plastering, including Requirements for Lathing and Furring, Specifications for	.25
A47-1932	Steel Reinforcing Bars (R26-30)	Under revision
A48-1932	Forms for Concrete Joist Construction Floors	.05
A49.1-1941	Gypsum, Specifications for (ASTM C22-41)	.25
A49.3-1940	Gypsum Plasters, Specifications for (ASTM C28-40)	.25
A49.4-1940	Gypsum Molding Plaster, Specifications for (ASTM C59-40)	.25
A49.5-1940	Gypsum Pottery Plaster, Specifications for (ASTM C60-40)	.25
A50.1-1939	Billet-Steel Bars for Concrete Reinforcement, Specifications for (ASTM A15-39)	.25
A50.2-1936	Rail-Steel Bars for Concrete Reinforcement, Specifications for (ASTM A16-35)	.25
A50.3-1936	Cold-Drawn Steel Wire for Concrete Reinforcement, Specifications for (ASTM A82-34)	.25
A59.1-1941	Reinforced Gypsum Concrete, Building Code Requirements	.25
A65.1-1941	Calcined Gypsum for Dental Plasters, Specifications for (ASTM C72-40)	.25
A66.1-1941	Keene's Cement, Specifications for (ASTM C61-40)	.25
A67.1-1942	*Gypsum Lath, Specifications for (ASTM C37-42)	.25
A68.1-1942	*Gypsum Sheathing Board, Specifications for (ASTM C79-42)	.25
A69.1-1942	*Gypsum Wall Board, Specifications for (ASTM C36-42)	.25

(For explanation of abbreviations, see page 14)

		Price
A70.1-1942	★Testing Gypsum and Gypsum Products, Methods of (ASTM C26-42)	.25
A73.1-1942	Concrete Masonry Units for Construction of Catch Basins and Manholes, Specifications for (ASTM C139-39)	.25
A74.1-1942	Structural Clay Load-Bearing Wall Tile, Specifications for (ASTM C34-41)	.25
A75.1-1942	Concrete Building Brick, Specifications for (ASTM C55-37)	.25
A76.1-1942	Structural Clay Non-Load-Bearing Tile, Specifications for (ASTM C56-41)	.25
A77.1-1942	Structural Clay Floor Tile, Specifications for (ASTM C57-39)	.25
A78.1-1942	Sand-Lime Building Brick, Specifications for (ASTM C73-39)	.25
A79.1-1942	Hollow Load-Bearing Concrete Masonry Units, Specifications for (ASTM C90-39)	.25
A80.1-1942	Hollow Non-Load-Bearing Concrete Masonry Units, Specifications for (ASTM C129-39)	.25
A81.1-1942	Solid Load-Bearing Concrete Masonry Units, Specifications for (ASTM C145-40)	.25
A82.1-1942	Sampling and Testing Brick, Methods of (ASTM C67-41)	.25
A83.1-1942	Sampling and Testing Structural Clay Tile, Methods of (ASTM C112-36)	.25
A84.1-1942	Sampling and Testing Concrete Masonry Units, Methods of (ASTM C140-39)	.25
A85-1942	★Protective Lighting for Industrial Properties (American War Standard)	.50

For standard abbreviations and symbols in civil engineering, see Z10 and Z32.

B—Mechanical Engineering

B1.1-1935	Screw Threads for Bolts, Nuts, Machine Screws, and Threaded Parts	.60
B1.2-1941	Screw Thread Gages and Gaging	.60
B1.3-1941	Acme and Other Translating Threads	.45
B1.4-1942	★Straight Screw Threads for High-Temperature Bolting (American War Standard)	.25
B2.1-1942	★Pipe Threads	.75
B3.1-1933	Annular Ball Bearings — Single Row Type and Separable (Open) Type	.40
B3.2-1930	Annular Ball and Roller Bearings —Wide Type	
B3.3-1933	Angular Contact Type Ball Bearings	
B4a-1925	Tolerances, Allowances and Gages for Metal Fits	.50
B5b-1929	Tool Holder Shanks and Tool Post Openings	.25
B5c-1930	Milling Cutters	.75
B5.1-1941	T-Slots — Their Bolts, Nuts, Tongues and Cutters	.35
B5.4-1939	Taps, Cut and Ground Threads	1.25
B5.5-1932	Rotating Air Cylinders and Adapters	.35
B5.6-1941	Jig Bushings	.35
B5.7-1936	Circular and Dovetail Forming Tool Blanks	.40
B5.8-1936	Chucks and Chuck Jaws for Turret Lathes and Automatic Lathes	.45
B5.9-1936	Lathe Spindle Noses for Turret Lathes and Automatic Lathes	.50
B5.10-1937	Machine Tapers	.50
B5.11-1937	Adjustable Adapters for Multiple Spindle Drilling Heads	.50
B5.12-1940	Twist Drills, Straight Shank	.55
B5.13-1939	Terminology and Definitions for Single-Point Cutting Tools	.40
B5.14-1941	Reamers	.75
B5.15-1939	Involute Splines, Side Bearing	.65
B5.16-1941	Accuracy of Engine Lathes (American Defense Emergency Standard)	.25
B5.17-1943	★Markings for Grinding Wheels	.25
B6.1-1932	Spur Gear Tooth Form	.45
B6.2-1933	Gear Materials and Blanks	.50
B6.3-1940	Backlash for General Purpose Spur Gearing	.25
B7-1935	Use, Care and Protection of Abrasive Wheels, Safety Code for the	.15
B8-1932	Protection of Industrial Workers in Foundries, Safety Code for the	.20
B9-1939	Mechanical Refrigeration, Safety Code for (ASRE Circular 15)	.20
B11-1937	Power Presses and Foot and Hand Presses, Safety Code for	.50
B13-1924	Logging and Sawmill Safety Code. (NBS Handbook H5)	Under revision—Out of print
B15-1927	Mechanical Power-Transmission Apparatus, Safety Code for	.35
B16a-1939	Cast-Iron Pipe Flanges and Flanged Fittings, Class 125	.60
B16b-1928	Cast-Iron Pipe Flanges and Flanged Fittings (for Maximum WSP of 250 lb)	.50
B16b1-1931	Cast-Iron Pipe Flanges and Flanged Fittings (for 800 lb Hydraulic Pressure)	.35
B16b2-1931	Cast-Iron Pipe Flanges and Flanged Fittings (for Maximum WSP of 25 lb)	.40
B16c-1939	Malleable-Iron Screwed Fittings, 150 lb	.50
B16d-1941	Cast-Iron Screwed Fittings, 125 and 250 lb	.40
B16e-1939	Steel Pipe Flanges and Flanged Fittings (includes Addendum B-16e4-1940)	1.25
B16e2-1936	Pipe Plugs of Cast Iron, Malleable Iron, Cast Steel or Forged Steel	.35
B16e5-1943	★Pressure-Temperature Ratings for Steel Pipe Flanges, Flanged Fittings, and Valves (Revision of Tables 6 to 11, inclusive, American Standard B16e-1939) (American War Standard)	.25
B16g-1929	Cast-Iron Long Turn Sprinkler Fittings (includes Addendum B16g1-1937)	.50
B16.9-1940	Steel Butt-Welding Fittings	.40
B16.10-1939	Face-to-Face Dimensions of Ferrous Flanged and Welding End Valves	.55
B16.12-1942	Cast-Iron Screwed Drainage Fittings	.45
B17c-1927	Code for Design of Transmission Shafting	.75
B17f-1930	Woodruff Keys, Keyslots and Cutters	.35
B17.1-1934	Shafting and Stock Keys	.45
B18a-1927	Small Rivets with Addendum B18a1-1942	.35
	★(Addendum B18a1-1942 sold separately .. 10¢)	
B18c-1930	Slotted Head Proportions, Machine Screws, Cap Screws and Wood Screws	.45
B18d-1930	Track Bolts and Nuts	.40
B18f-1928	Plow Bolts	.35
B18g-1929	Tinners', Coopers' and Belt Rivets with Addendum B18g1-1942	.35
	★(Addendum B18g1-1942 sold separately .. 10¢)	
B18.2-1941	Wrench-Head Bolts and Nuts and Wrench Openings	.65
B18.3-1936	Socket Set Screws and Socket Head Cap Screws	.40
B18.4-1937	Large Rivets	.65
B18.5-1939	Round Unslotted Head Bolts	.50
B19-1938	Compressed Air Machinery and Equipment, Safety Code for	.30

(For explanation of abbreviations, see page 14)

		Price
B24-1927	Forging and Hot Metal Stamping, Safety Code for (BLS 451) **Under revision—Out of print**	
B26-1925	Fire-Hose Coupling Screw Thread	.25
B28a-1927	Rubber Mills and Calenders, Safety Code for (BLS 447)	.05
B29a-1930	Roller Chains, Sprockets and Cutters .... **Under revision—Out of print**	
B30.2-1943	★Cranes, Derricks, and Hoists, Safety Code for	1.50
B31.1-1942	★Code for Pressure Piping	2.00
B32.1-1941	Preferred Thicknesses for Uncoated Thin Flat Metals (Under 0.250 In.)	.25
B33.1-1935	Hose Coupling Screw Threads	.25
B36.1-1942	★Welded and Seamless Steel Pipe, Specifications for (ASTM A53-42)	.25
B36.2-1939	Welded Wrought-Iron Pipe, Specifications for (ASTM A72-39)	.25
B36.3-1942	★Lap-Welded and Seamless Steel Pipe for High-Temperature Service, Specifications for (ASTM A106-42T)	.25
B36.4-1942	★Electric-Fusion-Welded Steel Pipe (sizes 30 in. and over), Specifications for (ASTM A134-42)	.25
B36.5-1942	★Electric-Resistance-Welded Steel Pipe, Specifications for (ASTM A135-42)	.25
B36.6-1935	Forge-Welded Steel Pipe, Specifications for (ASTM A136-34)	.25
B36.7-1935	Lock-Bar Steel Pipe, Specifications for (ASTM A137-34) **Withdrawn**	
B36.8-1935	Riveted Steel and Wrought-Iron Pipe, Specifications for (ASTM A138-34)	.25
B36.9-1942	★Electric-Fusion-Welded Steel Pipe (sizes 8 in. to but not including 30 in.), Specifications for (ASTM A139-42)	.25
B36.10-1939	Wrought-Iron and Wrought-Steel Pipe	.50
B36.11-1942	★Electric-Fusion-Welded Steel Pipe for High-Temperature and High-Pressure Service, Specifications for (ASTM A155-42)	.25
B36.12-1942	★Lap-Welded and Seamless Steel and Lap-Welded Iron Boiler Tubes, Specifications for (ASTM A83-42)	.25
B36.13-1942	Electric-Resistance-Welded Steel and Open-Hearth Iron Boiler Tubes, Specifications for (ASTM A178-40)	.25
B36.14-1942	Seamless Steel Boiler Tubes for High-Pressure Service, Specifications for (ASTM A192-40)	.25
B36.15-1942	Medium-Carbon Seamless Steel Boiler and Superheater Tubes, Specifications for (ASTM A210-40)	.25
B36.16-1942	Spiral-Welded Steel or Iron Pipe, Specifications for (ASTM A211-40)	.25
B36.17-1942	★Seamless Alloy-Steel Boiler and Superheater Tubes, Specifications for (ASTM A213-42)	.25
B36.18-1942	Electric-Resistance-Welded Steel Boiler and Superheater Tubes for High-Pressure Service, Specifications for (ASTM A226-40)	.25
B38c1-1931	Code for Testing Domestic Refrigerators Using Ice	.20
B40.1-1939	Indicating Pressure and Vacuum Gages	.40
B45.1-1932	Foundry Patterns of Wood (CS 19-32) **Out of print**	
*B46	Surface Roughness, Proposed American Standard	.30

*This document is a **Proposed American Standard** that is available at the price indicated, pending final approval. Comments and criticisms are welcome.

		Price
B47.1-1941	Gage Blanks (CS8-41)	.15
B48.1-1933	Inch-Millimeter Conversion for Industrial Use	.20
B49-1932	Shaft Couplings, Integrally Forged Flange Type for Hydro-Electric Units	.35
No Symbol	Tolerances for Cylindrical Fits (A primer—not a standard)	.25

For standard abbreviations and symbols in mechanical engineering, see Z10 and Z32.

C—Electrical Engineering

C1-1940	National Electrical Code (NBFU Pamphlet 70)	.05
C2	National Electrical Safety Code **(parts sold separately—see below)**	
C2.1-1941	Safety Rules for the Installation and Maintenance of Electrical Supply Stations (NBS Handbook H31)	.10
C2.2-1941	Safety Rules for the Installation and Maintenance of Electric Supply and Communication Lines (NBS Handbook H32)	.65
C2.3-1941	Safety Rules for the Installation and Maintenance of Electric Utilization Equipment (NBS Handbook H33)	.15
C2.4-1939	Safety Rules for the Operation of Electric Equipment and Lines (NBS Handbook H34)	.10
C2.5-1940	Safety Rules for Radio Installations (NBS Handbook H35)	.10
C5	Code for Protection Against Lightning	.15
C5.1-1937	Part I, Protection of Persons	
C5.2-1937	Part II, Protection of Buildings and Miscellaneous Property	
C5.3-1937	Part III, Protection of Structures Containing Inflammable Liquids and Gases ..... (NBS Handbook H21)	
C6-1938	Rotation, Connections and Terminal Markings for Electric Power Apparatus	1.00
C8.1-1932	Definitions and General Standards for Wires and Cables (AIEE 30-1937)	.40
C8.5-1936	Cotton-Covered Round Copper Magnet Wire, Specifications for	.30
C8.6-1936	Silk-Covered Round Copper Magnet Wire, Specifications for	
C8.7-1936	Enameled Round Copper Magnet Wire, Specifications for	
C8.9-1942	Slow-Burning Wire and Cable, Specifications for	.25
C8.10-1942	Impregnated Paper Insulation of Solid Type for Lead-Covered Power Cable **Under revision**	
C8.11-1936	Code Rubber Insulation for Wire and Cable for General Purposes	.20
C8.12-1942	Cotton Braid for Insulated Wire and Cable for General Purposes, Specifications for	.25
C8.13-1942	Varnished Cloth Insulation for Lead-Covered or Braid-Covered Power Cable, Specifications for	.50
C8.14-1938	Bare Concentric-Stranded Copper Cable for Insulated Conductors: Hard, Medium-Hard or Soft, Specifications for	.50
C8.15-1942	Metallic Coverings for Insulated Wire and Cable, Specifications for	.25
C8.16-1940	Rubber-Insulated Tree Wire, Specifications for	.20
C8.17-1936	Class AO 30% Rubber Insulation for Wire and Cable for General Purposes	.20
C8.18-1942	★Weather-Resistant (Weather-Proof) Wire and Cable—URC Type, Specifications for	.25

(For explanation of abbreviations, see page 14)

		Price
C8.19-1939	Weather-Resistant Saturants and Finishes for Aerial Rubber Insulated Wire and Cable, Specifications for	.20
C8.20-1939	Heavy-Walled Enamelled Round Copper Magnet Wire, Specifications for	.20
C10-1924	**See Z32.9-1943**	
C11-1927	Hard Drawn Aluminum Conductors, Physical and Electrical Properties (AIEE 46-1927)	.20
C12-1941	Code for Electricity Meters with American War Standard Revision C12WS-1942 ★(American War Standard C12WS-1942 sold separately .. 10¢)	2.00
C13-1926	Tubular Steel Poles for Electric Line Construction, Specifications for	.25
C15-1935	750 Volt Direct Suspension Overhead Trolley Contact Construction **Out of print**	
C16.2-1939	Standard Vacuum Tube Base and Socket Dimensions	.20
C16.3-1939	Manufacturing Standards Applying to Broadcast Receivers	.20
C16.4-1942	★Loudspeaker Testing	.25
C16.5-1942	★Volume Measurement of Electrical Speech and Program Waves	.20
C16.6-1943	★Fixed Paper-Dielectric Capacitors (Home Receiver Replacement Type) (American War Standard)	.20
C16.7-1943	★Dry Electrolytic Capacitors (Home Receiver Replacement Type) (American War Standard)	.20
C16.8-1943	★Simplified List of Home Radio Replacement Parts (Paper and Electrolytic Capacitors, Volume Controls, Power and Audio Transformers and Reactors) (American War Standard)	.20
C16.9-1943	★Power and Audio Transformers and Reactors (Home Receiver Replacement Type) (American War Standard)	.25
C18-1941	Dry Cells and Batteries, Specifications for (NBS Circular C435)	.10
C19-1928	Industrial Control Apparatus (AIEE 15-1928) **Under revision—Out of print**	
C22-1925	**See C57.1-1942**	
C29a-1930	Insulator Tests (AIEE 41-1930).	.30
C33a-1929	Outlet Boxes **Out of print**	
C35.1-1943	★Rotating Electrical Machinery on Railway Locomotives and Rail Cars and Trolley, Gasoline-Electric and Oil-Electric Coaches (AIEE 11-1943)	.50
C37.1-1937	Relays Associated with Power Switchgear	.40
C37.2-1937	Automatic Stations	.40
*C37.4	Alternating-Current Power Circuit Breakers, Proposed American Standard	.60
*C37.5	Methods for Determining the Rms Value of a Sinusoidal Current Wave and a Normal Frequency Recovery Voltage, Proposed American Recommended Practice	
*C37.6	Schedule of Preferred Circuit-Breaker Ratings, Proposed American Recommended Practice	
*C37.7	Operating Duty (Duty Cycle) for Standard and Reclosing Service, Proposed American Recommended Practice	
*C37.8	Standard Rated Control Voltages, Proposed American Recommended Practice	
*C37.9	Test Code for Oil Circuit Breakers, Proposed American Recommended Practice	
C39.1-1938	Electrical Indicating Instruments (AIEE 33-1938)	.40
C39.2-1943	★Electrical Indicating Instruments (2½-and 3½-Inch Round, Flush-Mounting, Panel-Type) (American War Standard)	.50
C40-1928	Storage Batteries (AIEE 36-1928)	.20
C42-1941	Definitions of Electrical Terms	1.00
C44-1931	Rolled Threads for Screw Shells of Electric Sockets and Lamp Bases	.35
C48-1931	Electric Railway Control Apparatus, Standards for (AIEE 16-1933)	.40
C50-1943	★Rotating Electrical Machinery	1.25
C52.1-1933	Electric Arc Welding Apparatus, Standards for (AIEE 38-1934)	.40
C52.2-1933	Resistance Welding Apparatus, Standards for (AIEE 39-1934)	.30
C53-1932	**See C57.3-1942**	
C55-1934	Capacitors, Standards for (AIEE 18-1934)	.20
C57.1-1942	★Transformers, Regulators and Reactors (supersedes C57.1-1933 and C22-1925)	1.25
C57.2-1942	★Test Code for Transformers	
C57.3-1942	★Guides for Operation of Transformers and Regulators (supersedes C53-1932)	
C59.1-1940	Testing Molded Materials Used for Electrical Insulation, Methods of (ASTM D48-39) **Out of print**	
C59.2-1941	Testing Electrical Insulating Oils, Methods of (ASTM D117-40) **Out of print**	
C59.3-1939	Insulation Resistance of Electrical Insulating Materials, Methods of Test for (ASTM D257-38)	.25
C59.4-1935	Rubber Matting for Use Around Electrical Apparatus or Circuits Not Exceeding 3000 Volts to Ground, Specifications for (ASTM D178-24)	.25
C59.6-1939	Rubber Insulating Tape, Specifications for (ASTM D119-38)	.25
C59.10-1941	Testing Molding Powders Used in Manufacturing Molded Electrical Insulators, Methods of (ASTM D392-38)	.25
C59.11-1941	Impact Resistance of Electrical Insulating Materials, Methods of Test for (ASTM D256-38)	.25
C59.12-1942	Electrical Gloves, Voltage Rating of Gloves, 3000 Volts, Specifications for (ASTM D120-40)	.25
C62-1936	Lightning Arresters, Standards for (AIEE 28-1936)	.30
C64-1935	Carbon, Graphite and Metal-Graphite Brushes	.30
C65.1-1942	★Power-Operated Radio Receiving Appliances, Standard for	.25
C68.1-1942	★Measurement of Test Voltage in Dielectric Tests (AIEE 4-1943).	.40
C73-1941	Attachment Plugs and Receptacles	.30
C74-1942	Machine Tool Electrical Standards (American War Standard)	.40
C75.1-1943	★Ceramic Radio Insulating Materials, Class L (American War Standard)	.20
C75.3-1942	★Fixed Mica-Dielectric Capacitors (American War Standard)	.50
C75.4-1943	★Ceramic Radio Dielectric Materials, Class H (American War Standard)	.20

For standard abbreviations and symbols in electrical engineering, see Z10 and Z32.

***These documents are Proposed American Standards and Proposed American Recommended Practices that are available at the prices indicated, pending final approval. Comments or criticisms are welcome.**

(For explanation of abbreviations, see page 14)

D—Automotive

		Price
D6-1935	Manual on Uniform Traffic Control Devices for Streets and Highways	.50
D7.1-1941	Inspection Requirements for Motor Vehicles	.25
D8-1937	Railroad Highway Grade Crossing Protection (ARR Bulletin 2)	.10
D10.1-1942	Adjustable Face Traffic Control Signal Head Standards (ITE Technical Report 1)	.25

E—Transportation

E2-1923	Design for Joint Plates for Seven-Inch Girder-Grooved and Guard Rails	.10
E3-1923	Design for Joint Plates for Nine-Inch Girder-Grooved and Guard Rails	.10
E4-1933	Design for Seven-Inch Girder-Grooved Rail	.10
E5-1933	Design for Nine-Inch Girder-Grooved Rail	.10
E6-1933	Design for Seven-Inch Girder-Guard Rail	.10
E7-1933	Design for Nine-Inch Girder-Guard Rail	.10
E8-1933	Seven-Inch 82 lb Plain Girder Rail and Splice Bars	.10
E9-1933	Seven-Inch 92 lb Plain Girder Rail and Splice Bars	.10
E11-1933	Seven-Inch 102 lb Plain Girder Rail and Splice Bars	.10

G—Ferrous Materials and Metallurgy

G8b1-1931	Zinc-Coated (Galvanized) Sheets, Specifications for (ASTM A93-27)	.25
G8.1-1933	Zinc (Hot-Galvanized) Coatings on Structural Steel Shapes, Plates and Bars, and Their Products, Specifications for (ASTM A123-33)	.25
G8.3-1935	Zinc-Coated (Galvanized) Iron or Steel Telephone and Telegraph Line Wire, Specifications for (ASTM A111-33)	.25
G8.4-1935	Zinc-Coated (Galvanized) Iron or Steel Tie Wires, Specifications for (ASTM A112-33)	.25
G8.5-1935	Zinc-Coated Iron or Steel Chain-Link Fence Fabric Galvanized After Weaving, Specifications for (ASTM A117-33)	.25
G8.6-1935	Zinc-Coated (Galvanized) Iron or Steel Wire Strand (Cable), Specifications for (ASTM A122-33)	.25
G8.7-1941	Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses, Specifications for (ASTM A120-40)	.25
G8.8-1937	Zinc-Coated (Galvanized) Wrought Iron Sheets, Specifications for (ASTM A163-36) .... **Under revision**	
G9.1-1933	Carbon-Steel and Alloy-Steel Blooms, Billets and Slabs for Forgings, Specifications for (ASTM A17-29)	.25
G12-1936	Refined Iron Bars, Specifications for (ASTM A41-36)	.25
G17.1-1942	Carbon-Steel Castings for Valves, Flanges, and Fittings for High-Temperature Service, Specifications for (ASTM A95-41)	.25
G17.2-1939	Alloy-Steel Bolting Material for High-Temperature Service, Specifications for (ASTM A96-39)	.25
G17.3-1940	Forged or Rolled Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service, Specifications for (ASTM A105-40)	.25
G20-1939	Mild Steel Plates, Specifications for (ASTM A10-39)	.25
G21-1939	Structural Rivet Steel, Specifications for (ASTM A141-39)	.25
G23-1939	Uncoated Wrought-Iron Sheets, Specifications for (ASTM A162-39)	.25
G24-1942	★Steel for Bridges and Buildings, Specifications for (ASTM A7-1942)	.25
G25.1-1942	Gray Iron Castings, Specifications for (ASTM A48-41)	.25
G26.1-1942	Cast-Iron Culvert Pipe, Specifications for (ASTM A142-38)	.25
G27.1-1942	Lightweight and Thin-Sectioned Gray Iron Castings, Specifications for (ASTM A190-40)	.25
G28.1-1942	Boiler Rivet Steel and Rivets, Specifications for (ASTM A31-40)	.25
G29.1-1942	★Carbon-Steel Plates for Stationary Boilers and Other Pressure Vessels, Specifications for (ASTM A70-42)	.25
G30.1-1942	Low Tensile Strength Carbon-Steel Plates of Flange and Firebox Qualities, Specifications for (ASTM A89-39)	.25
G31.1-1942	Carbon-Silicon-Steel Plates of Ordinary Tensile Ranges for Fusion-Welded Boilers and Other Pressure Vessels, Specifications for (ASTM A201-39)	.25
G32.1-1942	Chrome-Manganese-Silicon (CMS) Alloy-Steel Plates for Boilers and Other Pressure Vessels, Specifications for (ASTM A202-39)	.25
G33.1-1942	★Low-Carbon Nickel-Steel Plates for Boilers and Other Pressure Vessels, Specifications for (ASTM A203-42)	.25
G34.1-1942	★Molybdenum-Steel Plates for Boilers and Other Pressure Vessels, Specifications for (ASTM A204-42)	.25
G25.1-1942	High Tensile Strength Carbon-Silicon Steel Plates for Boilers and Other Pressure Vessels (Plates 4½ in. and Under in Thickness), Specifications for (ASTM A212-39)	.25
G36.1-1942	★Alloy-Steel Castings for Valves, Flanges, and Fittings for Service at Temperatures from 750 to 1100 F, Specifications for (ASTM A157-42)	.25
G37.1-1942	Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for Service at Temperatures from 750 to 1100 F, Specifications for (ASTM A182-40)	.25
G38.1-1942	Carbon and Alloy-Steel Nuts for Bolts for High-Pressure and High-Temperature Service to 1100 F, Specifications for (ASTM A194-40)	.25
G39.1-1942	★Structural Steel for Locomotives and Cars, Specifications for (ASTM A113-42)	.25
G40.1-1942	Low Tensile Strength Carbon-Steel Plates of Structural Quality for Welding, Specifications for (ASTM A78-40)	.25
G41.1-1942	Structural Silicon Steel, Specifications for (ASTM A94-39)	.25
G42.1-1942	High-Strength Structural Rivet Steel, Specifications for (ASTM A195-41)	.25

(For explanation of abbreviations, see page 14)

		Price
G43.1-1942	Axle-Steel Bars for Concrete Reinforcement, Specifications for (ASTM A160-39)	.25
G44.1-1942	Fabricated Steel Bar or Rod Mats for Concrete Reinforcement, Specifications for (ASTM A184-37)	.25
G45.1-1942	Welded Steel Wire Fabric for Concrete Reinforcement, Specifications for (ASTM A185-37)	.25
G46.1-1942	★Forged or Rolled Steel Pipe Flanges for General Service, Specifications for (ASTM A181-42)	.25
G48.1-1942	Malleable Iron Castings, Specifications for (ASTM A47-33)	.25
G49.1-1942	Cupola Malleable Iron, Specifications for (ASTM A197-39)	.25
G50.1-1943	★Carbon-Steel Castings for Miscellaneous Industrial Uses, Specifications for (ASTM A27-42)	.25
G51.1-1943	★Carbon-Steel Castings Suitable for Fusion Welding for Miscellaneous Industrial Uses, Specifications for (ASTM A215-41)	.25
G52.1-1943	★Alloy-Steel Castings for Structural Purposes, Specifications for (ASTM A148-42)	.25

H—Non-Ferrous Materials and Metallurgy

H4.1-1942	Soft or Annealed Copper Wire, Specifications for (ASTM B3-41)	.25
H4.2-1941	Hard-Drawn Copper Wire, Specifications for (ASTM B1-40)	.25
H4.3-1941	Medium-Hard-Drawn Copper Wire, Specifications for (ASTM B2-40)	.25
H4.4-1940	Tinned Soft or Annealed Copper Wire for Electrical Purposes, Specifications for (ASTM B33-39)	.25
H4.5-1940	Bronze Trolley Wire, Specifications for (ASTM B9-39)	.25
H4.6-1940	Copper Trolley Wire, Specifications for (ASTM B47-39)	.25
H4.7-1942	Hot-Rolled Copper Rods for Electrical Purposes, Specifications for (ASTM B49-41)	.25
H7-1939	Copper-Base Alloy Forging Rods, Bars, and Shapes, Specifications for (ASTM B124-39T)	.25
H8-1942	★Free-Cutting Brass Rod for Use in Screw Machines, Specifications for (ASTM B16-42)	.25
H11-1924	Solder Metal, Specifications for (ASTM B32-21)	Out of print
H13-1925	Plumbago Crucibles for Non-Tilting Furnaces in Non-Ferrous Foundry Practice, Outside Dimensions of	.20
H23.1-1941	Copper Water Tube, Specifications for (ASTM B88-41)	.25
H17.1-1942	★Lake Copper Wire Bars, Cakes, Slabs, Billets, Ingots and Ingot Bars, Specifications for (ASTM B4-42)	.25
H17.2-1942	★Electrolytic Copper Wire Bars, Cakes, Slabs, Billets, Ingots and Ingot Bars, Specifications for (ASTM B5-42)	.25
H24.1-1943	★Slab Zinc (Spelter), Specifications for (ASTM B6-37)	.25
H25.1-1943	★Rolled Zinc, Specifications for (ASTM B69-39)	.25

J—Rubber

J1.1-1942	Sample Preparation for Physical Testing of Rubber Products, Methods of (ASTM D15-41)	.25
J2.1-1942	Tension Testing of Vulcanized Rubber, Methods of (ASTM D412-41)	.25
J3.1-1942	Adhesion of Vulcanized Rubber (Friction Test), Methods of Test for (ASTM D413-39)	.25
J4.1-1942	Accelerated Aging of Vulcanized Rubber by the Oxygen-Pressure Method, Method of Test for (ASTM D572-41)	.25
J5.1-1942	Accelerated Aging of Vulcanized Rubber by the Oven Method, Method of Test for (ASTM D573-42)	.25

K—Chemical Industry

K2-1927	Gas Safety Code for Installations and Work in Buildings	.20
K3-1935	Manganese Bronze, Methods of Chemical Analysis of (ASTM B27-36T)	.25
K4-1921	Gun Metal, Methods of Chemical Analysis of (ASTM B28-36T)	.25
K5-1922	Alloys of Lead, Tin, Antimony and Copper, Methods of Chemical Analysis of (ASTM B18-36T)	.25
K12-1921	Battery Assay of Copper, Methods of (ASTM B34-36T)	.25
K13-1930	Code for Identification of Gas-Mask Canisters (BLS 512)	.10
K14-1930	Soap; Toilet, Liquid, Specifications for (FS P-S-618a)	.05
K15-1939	Chemical Analysis of White Pigments, Methods of (ASTM D34-39)	.25
K16.1-1937	Dry Red Lead, Methods of Routine Analysis of (ASTM D49-37)	.25
K18-1942	★Laboratory Sampling and Analysis of Coal and Coke, Methods of (ASTM D271-42)	.25
K20.1-1936	Cubic Foot Weight of Crushed Bituminous Coal, Method of Test for (ASTM D291-29)	.25
K20.2-1936	Cubic Foot Weight of Coke, Method of Test for (ASTM D292-29)	.25
K20.3-1936	Coke, Method of Tumbler Test for (ASTM D294-29)	.25
K20.4-1936	Coke, Method of Shatter Test for (ASTM D141-23)	.25
K20.5-1936	Volume of Cell Space of Lump Coke, Method of Test for (ASTM D167-24)	.25
K21.1-1936	Determination of Toluol Insoluble Matter in Rosin (Chiefly Sand, Chips, Dirt and Bark), Method of Test for (ASTM D269-30)	.25
K22-1941	Zinc Oxide, Specifications for (ASTM D79-41)	.25
K23-1941	Basic Carbonate White Lead, Specifications for (ASTM D81-41)	.25
K24-1941	Red Lead, Specifications for (ASTM D83-41)	.25
K25-1941	Mineral Iron Oxide, Specifications for (ASTM D84-41)	.25
K26-1941	Lampblack, Specifications for (ASTM D209-41)	.25
K27-1941	Chrome Yellow, Specifications for (ASTM D211-41)	.25
K28-1941	Reduced Chrome Green, Specifications for (ASTM D213-41)	.25
K29-1941	Prussian Blue, Specifications for (ASTM D261-41)	.25
K31-1941	Reduced Para Red, Specifications for (ASTM D264-41)	.25
K32-1937	Spirits of Turpentine, Specifications for (ASTM D13-34)	.25
K33-1937	Sampling and Testing Turpentine, Methods of (ASTM D233-36)	.25
K34-1937	Raw Linseed Oil, Specifications for (ASTM D234-28)	.25
K35-1937	Boiled Linseed Oil, Specifications for (ASTM D260-33)	.25
K36-1941	Bone Black, Specifications for (ASTM D210-41)	.25
K37-1941	Chrome Oxide Green, Specifications for (ASTM D263-41)	.25

(For explanation of abbreviations, see page 14)

		Price
K41-1939	Specific Gravity of Pigments, Methods of Test for (ASTM D153-39)	.25
K42-1937	Coarse Particles in Dry Pigments and Coarse Particles and Skins in Mixtures of Pigments and Vehicles, Methods of Test for (ASTM D185-37)	.25
K44-1937	Yellow, Orange, Red, and Brown Pigments Containing Iron and Manganese, Methods of Routine Analysis of (ASTM D50-36)	.25
K45-1941	Titanium Dioxide Pigments, Specifications for (ASTM D476-41)	.25
K46-1940	Sampling Coal for Analysis, Method of (ASTM D21-40)	.25
K47-1941	Basic Sulfate White Lead, Specifications for (ASTM D82-41)	.25
K48-1941	Blue Lead; Basic Sulfate, Specifications for (ASTM D405-41)	.25
K49-1941	C. P. Para Red Toner, Specifications for (ASTM D475-41)	.25
K50-1941	C. P. Zinc Yellow (Zinc Chromate), Specifications for (ASTM D478-41)	.25
K51-1941	Alkalinity or Acidity of Pigments, Method of Test for (ASTM D278-31)	.25
K52-1941	Bleeding of Pigments, Methods of Test for (ASTM D279-31)	.25
K53-1941	Hygroscopic Moisture (and Other Matter Volatile Under the Test Conditions) in Pigments, Method of Test for (ASTM D280-33)	.25
K54-1941	Oil Absorption of Pigments, Method of Test for (ASTM D281-31)	.25
K55-1941	Acetone Extract in Dry Lampblack and Dry Bone Black, Method of Test for (ASTM D305-31)	.25
K56-1941	Tinting Strength of White Pigments, Method of Test for (ASTM D332-36)	.25
K57-1941	Mass Color and Tinting Strength of Color Pigments, Method of Test for (ASTM D387-36)	.25
K58-1941	Chemical Analysis of Yellow and Orange Pigments Containing Chromium Compounds, Blue Pigments, and Chrome Green, Methods of (ASTM D126-36)	.25
K59-1941	Chemical Analysis of Dry Mercuric Oxide, Method of (ASTM D284-33)	.25

L—Textile Industry

L1-1929	Textile Safety Code (BLS 509)	.10
L3.1-1941	Cotton Rubber-Lined Fire Hose for Public and Private Fire Department Use, Specifications for (ASTM D296-38)	.25
L5-1939	Testing Woven Textile Fabrics, General Methods of (ASTM D39-39)	.25
L10-1936	Shrinkage in Laundering of Woven Cotton Cloth, Method of Test for (ASTM D437-36)	.25
L11.1-1941	Body Sizes for Boys' Garments	.25
L13.1-1942	Tubular Sleeving and Braids, Methods of Testing and Tolerances for (ASTM D354-41)	.25
L15.1-1943	★Textile Testing Machines, Specifications for (ASTM D76-42)	.25
L16.1-1942	Testing Wool Felt, Methods of (ASTM D461-40)	.25

M—Mining

M2-1926	Installing and Using Electrical Equipment in Coal Mines, Safety Rules for (BMTP 402)	**Out of print**
M5-1932	Methods for Screen Testing of Ores (Hand Method)	.25
M6-1931	Drainage of Coal Mines	.40
M7.1-1933	Frogs, Switches and Turnouts for Coal Mine Tracks (Drawings for Light Rail Turnouts)	.30
M7.2-1935	Frogs, Switches and Turnouts for Coal Mine Tracks (Drawings for Heavy Rail Turnouts)	.30
M10-1928	Miscellaneous Outside Coal Handling Equipment	**Under revision**
M11-1927	Wire Rope for Mines	**Under revision**
M12-1928	Ladders and Stairs for Mines, Construction and Maintenance of	**Under revision**
M13-1942	Rock Dusting Coal Mines to Prevent Coal Dust Explosions	.20
M14-1930	Use of Explosives in Bituminous Coal Mines	.25
M15-1931	Coal Mine Transportation, Safety Code for	.20
M17-1930	Fire Fighting Equipment in Metal Mines	gratis
M18-1928	Underground Transportation in Metal Mines	gratis
M19-1928	Mechanical Loading Underground in Metal Mines	gratis
M20.1-1938	Classification of Coals by Rank, Specifications for (ASTM D388-38)	.25
M20.2-1937	Classification of Coals by Grade, Specifications for (ASTM D389-37)	.25
M20.3-1938	Designating the Size of Coal from its Screen Analysis, Method for (ASTM D431-38)	.25
M20.4-1939	Commercial Varieties of Bituminous and Subbituminous Coals, Definitions for (ASTM D493-39)	.25
M24-1932	Safety Rules for Installing and Using Electrical Equipment in Metal Mines	gratis

O—Wood Industry

O1-1930	Woodworking Plants, Safety Code for (BLS 519)	**Under revision—Out of print**
O3-1926	Cross-ties and Switch-ties, Specifications for	.25
O4a-1927	Testing Small Clear Specimens of Timber, Methods of (ASTM D143-27)	.25
O4b-1927	Conducting Static Tests of Timbers in Structural Sizes, Methods of (ASTM D198-27)	.25
O5a-1933	Ultimate Fiber Stresses of Wood Poles	.10
O5.1-1941	Northern White Cedar Poles, Specifications and Dimensions for	.20
O5.2-1941	Western Red Cedar Poles, Specifications and Dimensions for	.20
O5.3-1941	Chestnut Poles, Specifications and Dimensions for	.20
O5.4-1941	Southern Pine Poles, Specifications and Dimensions for	.20
O5.5-1941	Lodgepole Pine Poles, Specifications and Dimensions for	.20
O5.6-1941	Douglas Fir Poles, Specifications and Dimensions for	.20
O6-1939	Round Timber Piles, Specifications for (ASTM D25-27)	.25
O7-1939	Structural Wood Joist and Plank, Beams and Stringers, and Posts and Timbers, Specifications for (ASTM D245-37)	.25

P—Pulp and Paper Industry

P1-1936	Paper and Pulp Mills, Safety Code for	.25

(For explanation of abbreviations, see page 14)

Z—Miscellaneous

		Price
Z1.1-1941	Guide for Quality Control	.75
Z1.2-1941	Control Chart Method of Analyzing Data ..... (American War Standards)	
Z1.3-1942	Control Chart Method of Controlling Quality During Production (American War Standard)	.75
Z2-1938	Protection of Heads, Eyes and Respiratory Organs, Safety Code for (NBS Handbook H24)	.15
Z4.1-1935	Industrial Sanitation in Manufacturing Establishments, Safety Code for	.20
Z4.2-1942	Drinking Fountains, Specifications for	.10
Z4.3-1935	Sanitary Privy (Supplement No. 108 to the Public Health Reports)	.10
Z7.1-1942	Illuminating Engineering Nomenclature and Photometric Standards	.25
Z8-1941	Laundry Machinery and Operations, Safety Code for	.25
*Z9	Fundamentals Relating to the Design and Operation of Exhaust Systems (preliminary edition)	.40
Z9.1-1941	Safety in Electroplating Operations	.30

Z10 Symbols and Abbreviations

Z10c-1931	Symbols for Heat and Thermodynamics	.30
Z10d-1939	.....	See Z7.1-1942
Z10e-1930	Aeronautical Symbols	Under revision—Out of print
Z10f-1928	Mathematical Symbols	Under revision—Out of print
Z10g1-1929	Letter Symbols for Electrical Quantities (AIEE 17g1-1928) ..	.20
Z10g2-1933	.....	See Z32.3-1943
Z10g3-1933	.....	See Z32.5-1942
Z10g5-1933	Graphical Symbols Used for Electric Traction Including Railway Signaling (AIEE 17g5-1934) ...	.40
Z10g6-1929	.....	See Z32.5-1942
Z10.1-1941	Abbreviations for Scientific and Engineering Terms	.35
Z10.2-1942	Letter Symbols for Hydraulics ..	.35
Z10.3-1942	Letter Symbols for Mechanics of Solid Bodies	.25

Z11 Petroleum Products

Z11.1-1936	Standard Abridged Volume Correction Table for Petroleum Oils (ASTM D206-36; API 500-36) .	.25
Z11.2-1938	Viscosity by Means of the Saybolt Viscosimeter, Method of Test for (ASTM D88-38; API 518-38) ..	.25
Z11.4-1942	★Melting Point of Paraffin Wax, Method of Test for (ASTM D87-42; API 513-42)	.25
Z11.5-1939	Cloud and Pour Points, Method of Test for (ASTM D97-39; API 506-39)	.25
Z11.6-1933	Flash and Fire Points by Means of Open Cup, Method of Test for (ASTM D92-33; API 511-33)...	.25
Z11.7-1942	★Flash Point by Means of the Pensky-Martens Closed Tester, Method of Test for (ASTM D93-42; API 510-42)	.25
Z11.8-1940	Water and Sediment in Petroleum Products by Means of Centrifuge, Method of Test for (ASTM D96-40; API 520-40)	.25
Z11.9-1940	Water in Petroleum Products and Other Bituminous Materials, Method of Test for (ASTM D95-40; API 519-40)	.25
Z11.10-1940	Distillation of Gasoline, Naptha, Kerosine and Similar Petroleum Products, Method of Test for (ASTM D86-40; API 507-40) ..	.25
Z11.11-1940	Distillation of Natural Gasoline, Method of Test for (ASTM D216-40; API 508-40)	.25
Z11.13-1939	Sulfur in Petroleum Oils by Bomb Method, Method of Test for (ASTM D129-39; API 516-39) .	.25
Z11.14-1939	Thermal Value of Fuel Oil, Method of Test for (ASTM D240-39; API 517-39)	.25
Z11.15-1936	Steam Emulsion of Lubricating Oils, Method of Test for (ASTM D157-36; API 515-36)	.25
Z11.16-1940	Analysis of Grease, Methods of (ASTM D128-40; API 501-40)..	.25
Z11.17-1939	Burning Quality of Kerosine Oils, Method of Test for (ASTM D187-39; API 502-39)	.25
Z11.18-1930	Burning Quality of Mineral Seal Oil, Method of Test for (ASTM D239-30; API 504-30)	.25
Z11.19-1936	Burning Quality of Long-Time Burning Oil for Railway Use, Method of Test for (ASTM D219-36; API 503-36)	.25
Z11.21-1930	Detection of Free Sulfur and Corrosive Sulfur Compounds in Gasoline, Method of Test for (ASTM D130-30; API 521-30)	.25
Z11.22-1932	Melting Point of Petrolatum, Method of Test for (ASTM D127-30; API 523-30)	.25
Z11.23-1932	Determination of Autogenous Ignition Temperatures, Method of Test for (ASTM D286-30; API 522-30)	.25
Z11.24-1936	Flash Point by Means of the Tag Closed Tester, Method of Test for (ASTM D56-36; API 509-36)	.25
Z11.25-1941	Carbon Residue of Petroleum Products (Conradson Carbon Residue), Method of Test for (ASTM D189-41; API 505-41)..	.25
Z11.26-1941	Distillation of Gas Oil and Similar Distillate Fuel Oils, Method of Test for (ASTM D158-41; API 512-41)	.25
Z11.28-1939	Terms Relating to Petroleum, Definitions of (ASTM D288-39; API 535-39)	.25
Z11.29-1935	Dilution of Crankcase Oils, Method of Test for (ASTM D322-35; API 524-35)	.25
Z11.30-1940	Precipitation Number of Lubricating Oils, Method of Test for (ASTM D91-40; API 527-40)..	.25
Z11.31-1939	Gravity of Petroleum and Petroleum Products by Means of the Hydrometer, Method of Test for (ASTM D287-39; API 526-39)..	.25
Z11.32-1941	Distillation of Crude Petroleum, Method of Test for (ASTM D285-41; API 525-41)	.25
Z11.33-1935	Sampling Petroleum and Petroleum Products, Methods of (ASTM D270-33; API 528-33)..	.25
Z11.35-1938	Color of Refined Petroleum Oil by Means of Saybolt Chromometer, Method of Test for (ASTM D156-38; API 530-38)	.25
Z11.36-1942	★Gum Content of Gasoline, Method of Test for (ASTM D381-42; API 529-42)	.25
Z11.39-1939	Viscosity-Temperature Charts for Liquid Petroleum Products (ASTM D341-39; API 533-39) (Charts A, C, and D)	.75
Z11.41-1940	Unsulfonated Residue of Plant Spray Oils, Method of Test for (ASTM D483-40; API 536-40)..	.25
Z11.42-1940	Stoddard Solvent, Specifications for (ASTM D484-40; API 537-40)	.25

*This document is a **Proposed American Standard** that is available at the price indicated, pending final approval. Comments and criticisms are welcome.

(For explanation of abbreviations, see page 14)

		Price
Z11.43-1941	Distillation of Plant Spray Oils, Method of Test for (ASTM D447-41; API 538-41)	.25
Z11.44-1942	★Vapor Pressure of Petroleum Products (Reid Method), Method of Test for (ASTM D323-42; API 539-42)	.25
Z11.45-1941	Calculating Viscosity Index, Method for (ASTM D567-41; API 540-41)	.25
Z11.46-1941	Conversion of Kinematic Viscosity to Saybolt Universal Viscosity, Method for (ASTM D446-39; API 534-39)	.25
Z11.47-1942	★Carbon Residue of Petroleum Products (Ramsbottom Carbon Residue), Method of Test for (ASTM D524-42; API 541-42)	.25
Z11.48-1942	★Tetraethyl Lead in Gasoline, Method of Test for (ASTM D526-42; API 542-42)	.25

Z12 Dust Explosions

Z12.1-1942	Installation of Pulverized Fuel Systems, Safety Code for	1.00
Z12.2-1942	Prevention of Dust Explosions in Starch Factories, Safety Code for	
Z12.3-1942	Prevention of Dust Explosions in Flour and Feed Mills, Safety Code for	
Z12.4-1942	Prevention of Dust Explosions in Terminal Grain Elevators, Safety Code for	
Z12.5-1942	Prevention of Dust Explosions in Woodworking Plants, Safety Code for	
Z12.6-1942	Pulverizing Systems for Sugar and Cocoa, Safety Code for	
Z12.7-1942	Prevention of Dust Explosions in Coal Pneumatic Cleaning Plants, Safety Code for	
Z12.8-1942	Prevention of Dust Explosions in Wood Flour Manufacturing Establishments, Safety Code for	
Z12.9-1942	Prevention of Dust Ignitions in Spice Grinding Plants, Safety Code for	
Z12.10-1943	★Use of Inert Gas for Fire and Explosion Prevention, Safety Code for	
Z12.11-1942	Prevention of Dust Explosions in the Manufacture of Aluminum Bronze Powder, Safety Code for	
Z12.12-1943	★Prevention of Sulphur Dust Explosions and Fires, Safety Code for	
Z12.13-1943	★Prevention of Dust Ignitions in Country Grain Elevators, Safety Code for	
Z12.14-1943	★Suggested Good Practices for the Application of Suction and Venting for the Control of Dust in Grain Elevators and Storage Units	
Z14.1-1935	Drawings and Drafting Room Practice	.50
Z15.1-1932	Engineering and Scientific Charts for Lantern Slides	.50
Z15.2-1938	Time-Series Charts, Manual of Design and Construction	1.25
Z15.3-1943	★Engineering and Scientific Graphs for Publication	.75
Z16.1-1937	Method of Compiling Industrial Injury Rates	.20
Z16.2-1941	Compiling Industrial Accident Causes Part 1—Selection of Accident Factors Part 2 — Detailed Classification of Accident Factors	1.00
Z17.1-1936	Preferred Numbers	.25
Z20.1-1941	Portable Steel and Wood Grandstands, Building Code Requirements	.60

		Price
Z21	**Gas-Burning Appliances, Approval and Installation Requirements**	
Z21.1-1942	★Domestic Gas Ranges, Approval Requirements for	1.00
Z21.1ES-1942	Domestic Gas Ranges, Approval Requirements for (American Emergency Standard)	1.00
Z21.2-1938	Flexible Gas Tubing, Listing Requirements for	.40
Z21.3-1940	Hotel and Restaurant Ranges and Unit Broilers, Approval Requirements for	1.00
Z21.4-1932	Private Garage Heaters, Approval Requirements for	.40
Z21.5-1940	Clothes Dryers, Approval Requirements for	1.00
Z21.6-1932	Incinerators, Approval Requirements for	.40
Z21.7-1932	Gas Heated Ironers, Approval Requirements for	.40
Z21.8-1940	Installation of Conversion Burners in House Heating and Water Heating Appliances, Requirements for	.50
Z21.9-1940	Hot Plates and Laundry Stoves, Approval Requirements for	.50
Z21.10-1941	Gas Water Heaters, Approval Requirements for	1.00
Z21.10WS-1942	Gas Water Heaters, Approval Requirements for (American War Standard)	1.00
Z21.11-1942	★Gas Space Heaters, Approval Requirements for	1.00
Z21.12-1937	Draft Hoods, Listing Requirements for	.50
Z21.13-1943	★Central Heating Gas Appliances, Approval Requirements for	1.00
Z21.14-1934	Industrial Gas Boilers, Approval Requirements for	.40
Z21.15-1942	Gas Valves, Listing Requirements for	.50
Z21.16-1940	Gas Unit Heaters, Approval Requirements for	1.00
Z21.17-1940	Gas Conversion Burners, Listing Requirements for	.50
Z21.18-1934	Domestic Gas Appliance Pressure Regulators, Listing Requirements for	.30
Z21.19-1942	Refrigerators Using Gas Fuel, Approval Requirements for	1.00
Z21.20-1940	Automatic Pilots, Listing Requirements for	.50
Z21.21-1935	Automatic Main Gas-Control Valves, Listing Requirements for	.30
Z21.22-1935	Relief and Automatic Gas Shut-off Valves for Use on Water Heating Systems, Listing Requirements for	.40
Z21.23-1940	Gas Appliance Thermostats, Listing Requirements for	.50
Z21.24-1941	Semi-Rigid Gas Appliance Tubing and Fittings, Listing Requirements for	.50
Z21.25-1937	Gas Hair Dryers, Approval Requirements for	1.00
Z21.26-1941	Attachable Gas Water Heating Units, Listing Requirements for	1.00
Z21.27-1940	Hotel and Restaurant Deep Fat Fryers, Approval Requirements for	1.00
Z21.28-1941	Portable Gas Baking and Roasting Ovens, Approval Requirements for	1.00
Z21.29-1941	Furnace Temperature Limit Controls and Fan Controls, Listing Requirements for	.50
Z21.31-1941	Gas Counter Appliances, Approval Requirements for	1.00
Z21.32-1942	Gas Appliance Connectors of Flexible Metal Tubing and Fittings, Listing Requirements for	.50
Z21.33-1942	Installation of Gas-Burning Equipment in Power Boilers, Requirements for	.50
Z21.34-1942	★Gas-Fired Duct Furnaces, Approval Requirements for	1.00

(For explanation of abbreviations, see page 14)

		Price
Z22	**Motion Pictures**	
Z22.2-1941	35-mm Sound Film; Emulsion and Sound Record Position in Camera—Negative	.50
Z22.3-1941	35-mm Sound Film; Emulsion and Sound Record Positions in Projector—Positive. For Direct Front Projection	
Z22.4-1941	35-mm Film; Projector Reels	
Z22.5-1941	16-mm Silent Film; Cutting and Perforating Negative and Positive Raw Stock	
Z22.6-1941	16-mm Film; Projector Sprockets	
Z22.7-1941	16-mm Silent Film; Camera Aperture	
Z22.8-1941	16-mm Silent Film; Projector Aperture	
Z22.9-1941	16-mm Silent Film; Emulsion Position in Camera—Negative	
Z22.10-1941	16-mm Silent Film; Emulsion Position in Projector—Positive. For Direct Front Projection	
Z22.11-1941	16-mm Film; Projection Reels	
Z22.12-1941	16-mm Sound Film; Cutting and Perforating Negative and Positive Raw Stock	
Z22.13-1941	16-mm Sound Film; Camera Aperture	
Z22.14-1941	16-mm Sound Film; Projector Aperture	
Z22.15-1941	16-mm Sound Film; Emulsion and Sound Record Positions in Camera—Negative	
Z22.16-1941	16-mm Sound Film; Emulsion and Sound Record Positions in Projector—Positive	
Z22.17-1941	8-mm Film; Cutting and Perforating Negative and Positive Raw Stock	
Z22.18-1941	8-mm Film; 8-Tooth Projector Sprockets	
Z22.19-1941	8-mm Silent Film; Camera Aperture	
Z22.20-1941	8-mm Silent Film; Projector Aperture	
Z22.21-1941	8-mm Silent Film; Emulsion Position in Camera—Negative	
Z22.22-1941	8-mm Silent Film; Emulsion Position in Projector—Positive. For Direct Front Projection	
Z22.23-1941	8-mm Silent Film; Projection Reels	
Z22.24-1941	16-mm Silent Film; Film Splices—Negative and Positive	
Z22.25-1941	16-mm Sound Film; Film Splices—Negative and Positive	
Z22.26-1941	Sensitometry	
Z22.27-1941	Photographic Density	
Z22.28-1941	Projection Rooms	
Z22.29-1941	Projection Screens	
Z22.30-1941	Nomenclature	
Z22.31-1941	Safety Film	
Z22.32-1941	Fader Setting Instructions	
Z22.33-1941	Nomenclature for Filters	
Z22.34-1930	35-mm Film; Cutting and Perforating Negative and Positive Raw Stock	
Z22.35-1930	35-mm Film; 16-Tooth Projector Sprockets	
Z23.1-1939	Sieves for Testing Purposes, Specifications for (ASTM E11-39)	.25
Z24.1-1942	Acoustical Terminology	.25
Z24.2-1942	Noise Measurement	.25
Z24.3-1936	Sound Level Meters for Measurement of Noise and Other Sounds	.25
Z24.4-1938	Calibration of Microphones	.25
Z25.1-1940	Rules for Rounding Off Numerical Values	.20
Z26.1-1938	Safety Glass for Glazing Motor Vehicles Operating on Land Highways, Safety Code for	.20
Z27-1933	Installation, Maintenance and Use of Piping and Fittings for City Gas	.35
Z29.1-1935	Reference Data for Periodicals	.15
Z30.2-1936	Thermal Analysis of Steel (ASTM E14-33)	.25
Z31-1933	Marking of Gold Filled and Rolled Gold Plate Articles Other than Watchcases (CS47-34)	.05
Z32.1-1942	★Welding Symbols and Instructions for Their Use	.25
Z32.2-1941	Graphical Symbols for Use on Drawings in Mechanical Engineering	.50
Z32.3-1943	★Graphical Symbols for Power, Control and Measurement (supersedes Z10g2-1933)	.40
Z32.5-1942	★Telephone, Telegraph and Radio Use, Symbols for (supersedes Z10g2-1933 and Z10g6-1929)	.30
Z32.9-1943	★Graphical Electrical Symbols for Architectural Plans (supersedes C10-1924)	.20
Z33.1-1938	Regulations for the Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal (NBFU 91)	.15
Z35.1-1941	Industrial Accident Prevention Signs, Specifications for	.35
Z37.1-1941	Allowable Concentration of Carbon Monoxide	.20
Z37.2-1941	Allowable Concentration of Hydrogen Sulfide	.20
Z37.3-1941	Allowable Concentration of Carbon Disulfide	.20
Z37.4-1941	Allowable Concentration of Benzene	.20
Z37.5-1941	Allowable Concentration of Cadmium (American Defense Emergency Standard)	.20
Z37.6-1942	Allowable Concentration of Manganese (American War Standard)	.20
Z37.7-1943	★Allowable Concentration of Chromic Acid and Chromates	.20
Z37.8-1943	★Allowable Concentration of Mercury	.20
Z38.1.1-1941	Film Pack Tabs and Films, Dimensions for	.10
Z38.1.2-1941	Film Pack Cases, Dimensions for	.10
Z38.1.3-1941	70-mm Perforated (and Unperforated) Film (Cutting and Perforating Standard), Dimensions for (Not for Motion Pictures)	.10
Z38.1.4-1942	★Dimensions of Photographic Paper (Roll Leaders and Limit Signals)	.10
*Z38.2.1	Determining Photographic Speeds of Roll Films, Film Packs and Miniature Camera Films, Proposed American Standard Specifications for	.25
Z38.2.2-1942	Photographic Exposure Computer (American Emergency Standard)	1.00
Z38.4.1-1942	★Cameras (Tripod Connections for American Cameras)	.10
Z38.4.2-1942	★Cameras (Tripod Connections for European Cameras with Adapter for American Tripods)	.10
Z38.4.3-1942	★Distance Scales Marked in Feet	.10
Z38.4.4-1942	★Focal Lengths of Lenses: Marking	.10
Z38.4.5-1942	★Shutter Cable Release Tip and Socket with Taper Thread	.10
Z38.4.6-1942	★Shutter Cable Release Tip and Socket with Straight Thread	.10
*Z38.7.1	Printing Equipment (Contact Printing Machines, Printing Frames, and Masks), Proposed American Standard for	.10
*Z38.7.2	Projection Equipment (Film Strip Projectors, Viewing Devices for 35-mm Film and Reading Devices for Microfilm), Proposed American Standard for	.10
*Z38.7.3	Lantern Slide Projectors (exclusive of Microfilm Readers), Proposed American Standard for	.10

*These documents are **Proposed American Standards** that are available at the prices indicated, pending final approval. Comments and criticisms are welcome.

(For explanation of abbreviations, see page 14)

		Price
*Z38.7.4	Opaque Projectors for Written or Printed Matter and Pictures, Proposed American Standard for	.10
*Z38.7.5	Testing Printing and Projection Equipment, Proposed American Standard Methods of	.10
*Z38.7.6	Photographic Projection Printing Machines, Proposed American Standard for	.10
*Z38.7.7	Photographic Projection Printing Machines, Proposed American Recommended Practice for	.10
Z41.1-1943	★Men's Safety-Toe Shoes (American War Standard)	.40
Z41.3-1943	★Men's Conductive Shoes, 2nd ed (American War Standard)	
Z41.4-1943	★Men's Explosives-Operations (Nonsparking) Shoes (American War Standard)	
Z41.5-1943	★Men's Electrical-Hazards Shoes, 2nd ed (American War Standard)	
Z41.6-1943	★Men's Foundry (Molders) Shoes, 2nd ed (American War Standard)	
Z41.2-1943	★Women's Safety-Toe (Oxford) Shoes, 2nd ed (American War Standard)	.25
Z43-1941	Grinding, Polishing and Buffing Equipment Sanitation	.60
Z44-1942	Specification and Description of Color (American War Standard)	.25

*These documents are **Proposed American Standards** and **Proposed American Recommended Practices** that are available at the prices indicated, pending final approval. Comments or criticisms are welcome.

		Price
Z48.1-1942	★Marking Compressed Gas Cylinders to Identify Content, Method of	.10

Commercial Standards

The following Commercial Standards, promulgated by the National Bureau of Standards, have been approved by the ASA.

CS8-41	Gage Blanks (American Standard B47.1-1941)	.15
CS19-32	Foundry Patterns of Wood (American Standard B45.1-1932)	Out of print
CS47-34	Marking of Gold Filled and Rolled Gold Plate Articles Other Than Watchcases (American Standard Z31-1933)	.05
CS49-34	Chip Board, Laminated Chip Board, and Miscellaneous Boards for Bookbinding Purposes	.05
CS50-34	Binders Board	.05
CS51-35	Marking Articles Made of Silver in Combination With Gold	.05
CS53-35	Colors and Finishes for Cast Stone	.05
CS54-35	Mattresses for Hospitals	.05
CS55-35	Mattresses for Institutions	.05
CS57-40	Book Cloths, Buckrams and Impregnated Fabrics for Bookbinding Purposes except Library Bindings	.05
CS67-38	Marking Articles Made of Karat Gold	.05
CS99-42	★Gas Floor Furnaces	.05

A complete set of all the above American Standards may be obtained at the special price of $150.00 per set.

American Safety Standards

(These are also included in the general list above)

A2.1-1942	★Fire Tests of Building Construction and Materials, Methods of (ASTM C19-41)	.25
A2.2-1942	★Fire Tests of Door Assemblies, Methods of (ASTM C152-41)	.25
A9.1-1942	Building Exits Code	1.00
A10.1-1939	Manual of Accident Prevention in Construction	2.00
A11-1942	Industrial Lighting	.25
A12-1932	Floor and Wall Openings, Railings and Toe Boards, Safety Code for	.20
A13-1928	Scheme for the Identification of Piping Systems	.50
A14-1935	Construction, Care and Use of Ladders, Safety Code for	.25
A17.1-1937	Safety Code for Elevators, Dumbwaiters, and Escalators, with Supplement A17.3-1942 (Supplement A17.3-1942 sold separately .. 25¢)	1.25
A17.2-1937	Inspection of Elevators (Inspectors' Manual)	.75
A23-1938	School Lighting	.25
A39-1933	Window Cleaning	.20
A85-1942	★Protective Lighting for Industrial Properties (American War Standard)	.50
B7-1935	Use, Care and Protection of Abrasive Wheels, Safety Code for the	.15
B8-1932	Protection of Industrial Workers in Foundries, Safety Code for	.20
B9-1939	Mechanical Refrigeration, Safety Code for (ASRE Circular 15)	.20
B11-1937	Power Presses and Foot and Hand Presses, Safety Code for	.50
B13-1924	Logging and Sawmill Safety Code (NBS Handbook H5)	Under revision—Out of print
B15-1927	Mechanical Power-Transmission Apparatus, Safety Code for	.35
B19-1938	Compressed Air Machinery and Equipment, Safety Code for	.30
B24-1927	Forging and Hot Metal Stamping, Safety Code for (BLS 451)	Under revision—Out of print
B28a-1927	Rubber Mills and Calenders, Safety Code for (BLS 447)	.05
B30.2-1943	★Cranes, Derricks, and Hoists, Safety Code for	1.50
C1-1940	National Electrical Code (NBFU Pamphlet 70)	.05
C2	National Electrical Safety Code	(parts sold separately—see next page)

(For explanation of abbreviations, see page 14)

		Price
C2.1-1941	Safety Rules for the Installation and Maintenance of Electrical Supply Stations (NBS Handbook H31)	.10
C2.2-1941	Safety Rules for the Installation and Maintenance of Electric Supply and Communication Lines (NBS Handbook H32)	.65
C2.3-1941	Safety Rules for the Installation and Maintenance of Electric Utilization Equipment (NBS Handbook H33)	.15
C2.4-1939	Safety Rules for the Operation of Electric Equipment and Lines (NBS Handbook H34)	.10
C2.5-1940	Safety Rules for Radio Installations (NBS Handbook H35)	.10
C5	Code for Protection Against Lightning	
C5.1-1937	Part I, Protection of Persons	.15
C5.2-1937	Part II, Protection of Buildings and Miscellaneous Property	
C5.3-1937	Part III, Protection of Structures Containing Inflammable Liquids and Gases (NBS Handbook H21)	
C74-1942	Machine Tool Electrical Standards	.40
D6-1935	Manual on Uniform Traffic Control Devices for Streets and Highways	.50
D7.1-1941	Inspection Requirements for Motor Vehicles	.25
D8-1937	Railroad Highway Grade Crossing Protection (AAR Bulletin 2)	.10
D10.1-1942	Adjustable Face Traffic Control Signal Head Standards (ITE Technical Report 1)	.25
K2-1927	Gas Safety Code for Installation and Work in Buildings	.20
K13-1930	Code for Identification of Gas-Mask Canisters (BLS 512)	.10
L1-1929	Textile Safety Code (BLS 509)	.10
M2-1926	Installing and Using Electrical Equipment in Coal Mines, Safety Rules for (BMTP 402)	Out of print
M10-1928	Miscellaneous Outside Coal Handling Equipment	Under revision
M11-1927	Wire Rope for Mines	Under revision
M12-1928	Ladders and Stairs for Mines, Construction and Maintenance of	Under revision
M13-1925	Rock Dusting Coal Mines to Prevent Coal Dust Explosions	.20
M14-1930	Use of Explosives in Bituminous Coal Mines	.25
M15-1931	Coal Mine Transportation, Safety Code for	.20
M17-1930	Fire Fighting Equipment in Metal Mines	gratis
M24-1932	Safety Rules for Installing and Using Electrical Equipment in Metal Mines	gratis
O1-1930	Woodworking Plants, Safety Code for (BLS 519)	Under revision—Out of print
P1-1936	Paper and Pulp Mills, Safety Code for	.25
Z2-1938	Protection of Heads, Eyes and Respiratory Organs, Safety Code for (NBS Handbook H24)	.15
Z4.1-1935	Industrial Sanitation in Manufacturing Establishments, Safety Code for	.20
Z4.2-1942	Drinking Fountains, Specifications for	.10
Z4.3-1935	Sanitary Privy (Supplement 108 to the Public Health Reports)	.10
Z7.1-1942	Illuminating Engineering Nomenclature and Photometric Standards	.25
Z8-1941	Laundry Machinery and Operations, Safety Code for	.25

		Price
*Z9	Fundamentals Relating to the Design and Operation of Exhaust Systems (preliminary edition)	.40
Z9.1-1941	Safety in Electroplating Operations	.30
Z12	**Prevention of Dust Explosions**	
Z12.1-1942	Installation of Pulverized-Fuel Systems, Safety Code for	1.00
Z12.2-1942	Prevention of Dust Explosions in Starch Factories, Safety Code for	
Z12.3-1942	Prevention of Dust Explosions in Flour and Feed Mills, Safety Code for	
Z12.4-1942	Prevention of Dust Explosions in Terminal Grain Elevators, Safety Code for	
Z12.5-1942	Prevention of Dust Explosions in Woodworking Plants, Safety Code for	
Z12.6-1942	Pulverizing Systems for Sugar and Cocoa, Safety Code for	
Z12.7-1942	Prevention of Dust Explosions in Coal Pneumatic Cleaning Plants, Safety Code for	
Z12.8-1942	Prevention of Dust Explosions in Wood Flour Manufacturing Establishments, Safety Code for	
Z12.9-1942	Prevention of Dust Ignitions in Spice Grinding Plants, Safety Code for	
Z12.10-1943	✱Use of Inert Gas for Fire and Explosion Prevention, Safety Code for	
Z12.11-1942	Prevention of Dust Explosions in the Manufacture of Aluminum Bronze Powder, Safety Code for	
Z12.12-1943	✱Prevention of Sulphur Dust Explosions and Fires, Safety Code for	
Z12.13-1943	✱Prevention of Dust Ignitions in Country Grain Elevators, Safety Code for	
Z12.14-1943	✱Suggested Good Practices for the Application of Suction and Venting for the Control of Dust in Grain Elevators and Storage Units	
Z16.1-1937	Method of Compiling Industrial Injury Rates	.20
Z16.2-1941	Compiling Industrial Accident Causes	1.00
	Part 1—Selection of Accident Factors	
	Part 2 — Detailed Classification of Accident Factors	
Z20.1-1941	Portable Steel and Wood Grandstands, Building Code Requirements	.60
Z26.1-1938	Safety Glass for Glazing Motor Vehicles Operating on Land Highways, Safety Code for	.20
Z33.1-1938	Regulations for the Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal (NBFU 91)	.15
Z35.1-1941	Industrial Accident Prevention Signs, Specifications for	.35
Z37.1-1941	Allowable Concentration of Carbon Monoxide	.20
Z37.2-1941	Allowable Concentration of Hydrogen Sulfide	.20
Z37.3-1941	Allowable Concentration of Carbon Disulfide	.20
Z37.4-1941	Allowable Concentration of Benzene	.20
Z37.5-1941	Allowable Concentration of Cadmium (American Defense Emergency Standard)	.20
Z37.6-1942	Allowable Concentration of Manganese (American War Standard)	.20

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(For explanation of abbreviations, see page 14)

		Price
Z37.7-1943	★Allowable Concentration of Chromic Acid and Chromates	.20
Z37.8-1943.	★Allowable Concentration of Mercury	.20
Z41.1-1943	★Men's Safety-Toe Shoes (American War Standard)	.40
Z41.3-1943†	★Men's Conductive Shoes, 2nd ed (American War Standard)	
Z41.4-1943	★Men's Explosives-Operations (Nonsparking) Shoes (American War Standard)	
Z41.5-1943†	★Men's Electrical-Hazards Shoes, 2nd ed (American War Standard)	
Z41.6-1943†	★Men's Foundry (Molders) Shoes, 2nd ed (American War Standard)	
Z41.2-1943†	★Women's Safety-Toe (Oxford) Shoes, 2nd ed (American War Standard)	.25
Z43-1941	Grinding, Polishing and Buffing Equipment Sanitation	.60
Z48.1-1942	★Marking Compressed Gas Cylinders to Identify Content, Method of	.10

†This is the second edition of these American War Standards approved by the ASA during 1943.

A complete set of these American Safety Standards may be obtained at the special price of $20.00 per set.

American War Standards

(These are also included in the general list above)

A85-1942	★Protective Lighting for Industrial Properties	.50
B1.4-1942	★Straight Screw Threads for High-Temperature Bolting	.25
B5.16-1941	Accuracy of Engine Lathes	.25
B16e5-1943	★Pressure-Temperature Ratings for Steel Pipe Flanges, Flanged Fittings, and Valves (Revision of Tables 6 to 11, inclusive, American Standard B16e-1939)	.25
C16.6-1943	★Fixed Paper-Dielectric Capacitors (Home Receiver Replacement Type)	.20
C16.7-1943	★Dry Electrolytic Capacitors (Home Receiver Replacement Type)	.20
C16.8-1943	★Simplified List of Home Radio Replacement Parts (Paper and Electrolytic Capacitors, Volume Controls, Power and Audio Transformers and Reactors)	.20
C16.9-1943	★Power and Audio Transformers and Reactors (Home Receiver Replacement Type)	.25
C39.2-1943	★Electrical Indicating Instruments (2½- and 3½-Inch Round, Flush-Mounting, Panel-Type)	.50
C74-1942	Machine Tool Electrical Standards	.40
C75.1-1943	★Ceramic Radio Insulating Materials, Class L	.20
C75.3-1942	★Fixed Mica-Dielectric Capacitors.	.50
C75.4-1943	★Ceramic Radio Dielectric Materials, Class H	.20
Z1.1-1941	Guide for Quality Control	.75
Z1.2-1941	Control Chart Method of Analyzing Data	
Z1.3-1942	Control Chart Method of Controlling Quality During Production	.75
Z21.1ES-1942	Domestic Gas Ranges, Approval Requirements for	1.00
Z21.10WS-1942	Gas Water Heaters, Approval Requirements for	1.00
Z37.5-1941	Allowable Concentration of Cadmium	.20
Z37.6-1942	Allowable Concentration of Manganese	.20
Z38.2.2-1942	Photographic Exposure Computer	1.00
Z41.1-1943	★Men's Safety-Toe Shoes	.40
Z41.3-1943	★Men's Conductive Shoes, 2nd ed.	
Z41.4-1943	★Men's Explosives-Operations (Nonsparking) Shoes	
Z41.5-1943	★Men's Electrical-Hazards Shoes, 2nd ed	
Z41.6-1943	★Men's Foundry (Molders) Shoes, 2nd ed	
Z41.2-1943	★Women's Safety-Toe (Oxford) Shoes, 2nd ed	.25
Z44-1942	Specification and Description of Color	.25

Abbreviations

AAR	Association of American Railroads
AIEE	American Institute of Electrical Engineers
API	American Petroleum Institute
ASRE	American Society of Refrigerating Engineers
ASTM	American Society for Testing Materials
BMTP	U. S. Bureau of Mines Technical Paper
NBS	National Bureau of Standards
CS	Commercial Standard
FS	Federal Specification
ITE	Institute of Traffic Engineers
BLS	U. S. Bureau of Labor Statistics Bulletin
NBFU	National Board of Fire Underwriters
SPR	Simplified Practice Recommendation

Index to List of American Standards

Abbreviations—see also Symbols
for scientific and engineering terms Z10.1-1941
Abrasive wheels, safety code B7-1935
Accident prevention—see Safety Standards
Acoustical measurements
microphones, calibration Z24.4-1938
noise measurement Z24.2-1942
sound level meters Z24.3-1936
terminology Z24.1-1942
Allowable concentrations of toxic dusts and gases—see Toxic dusts and gases
Alloys of lead, tin, antimony and copper K5-1922
Automatic stations C37.2-1937
Automobiles
glass, safety Z26.1-1938
inspection requirements D7.1-1941

Bars
billet-steel, concrete reinforcement A50.1-1939
rail-steel, concrete reinforcement A50.2-1936
refined iron G12-1936
steel reinforcing A47-1932
Batteries
dry cell C18-1941
storage C40-1928
Bearings, ball and roller B3
Benzene, allowable concentration Z37.4-1941
Binders board CS50-34
Bitumen, determination of A37.3-1930
Bituminous materials
float test A37.2-1930
penetration test A37.1-1930
Blooms, billets and slabs for forgings, carbon-steel and alloy-steel G9.1-1933
Blower and exhaust systems Z33.1-1938
Boilers, gas, approval and installation requirements Z21.14-1934
Bolts and bolting materials
alloy steel G17.2-1939, G38.1-1942
plow B18f-1928
round unslotted head B18.5-1939
screw threads B1.1-1935, B1.4-1942
track B18d-1930
wrench-head, and wrench openings B18.2-1941
Bookcloths CS57-40
Braid L13.1-1942
Brick A75.1-1942, A78.1-1942, A82.1-1942
Bridges, steel for G24-1942
Broilers, gas unit, approval and installation requirements Z21.3-1940
Brushes; carbon, graphite C64-1935
Buffing—see Grinding, polishing and buffing
Building, codes and materials
accident prevention signs Z35.1-1941
blower and exhaust systems Z33.1-1938
brick A75.1-1942, A78.1-1942, A82.1-1942
concrete masonry units A73.1-1942, A79.1-1942 A80.1-1942, A81.1-1942, A84.1-1942
concrete, voids in aggregates A19-1937
construction safety code A10.1-1939
cranes, safety code B30.2-1943
derricks, safety code B30.2-1943
dumbwaiters
safety code and supplement A17.1-1937, A17.3-1942
dust explosions, prevention Z12
electrical code, National C1-1940
electrical safety code, National C2
elevators
inspection A17.2-1937
safety code and supplement A17.1-1937, A17.3-1942
escalators
safety code and supplement A17.1-1937, A17.3-1942
exits, building A9.1-1942
fire hose
cotton rubber-lined L3.1-1941
screw thread, coupling B26-1925
fire tests A2.1-1942, A2.2-1942
floor and wall openings A12-1932
floors, forms for concrete joist construction..A48-1932
gas-burning appliances, approval and installation requirements Z21
gas, city, piping and fittings Z27-1933
gas safety code K2-1927
grandstands, portable steel and wood Z20.1-1941
gypsum A42.1-1942, A49.1-1941, A49.3-1940 A49.4-1940, A49.5-1940, A59.1-1941 A66.1-1941, A67.1-1942, A68.1-1942 A69.1-1942, A70.1-1942
hoists, safety code B30.2-1943
industrial sanitation Z4

Building, codes and materials (continued)
ladders A14-1935
lighting
industrial A11-1942
protective A85-1942
schools A23-1938
lightning, protection against C5
pipe, cast iron soil A40.1-1935
pipe flanges and fittings B16
poles, wood O5
railings and toe boards A12-1932
refrigeration, safety code B9-1939
steel
bridges and buildings G24-1942
plates, mild G20-1939
rivet G21-1939, G28.1-1942
silicon G41.1-1942
steel, concrete reinforcement
bars A47-1932
spirals A38-1933
tile, structural A74.1-1942, A76.1-1942 A77.1-1942, A83.1-1942
timber
piles, round O6-1939
small clear specimens O4a-1927
structural O7-1939
static tests O4b-1927
window cleaning, safety code A39-1933

Cable—see Wire and cable
Cadmium, allowable concentration Z37.5-1941
Capacitors C55-1934
dry electrolytic C16.7-1943
mica-dielectric C75.3-1942
paper-dielectric C16.6-1943
Carbon disulfide, allowable concentration ...Z37.3-1941
Carbon monoxide, allowable concentration ..Z37.1-1941
Cast Iron
gray-iron castings G25.1-1942, G27.1-1942
malleable iron
castings G48.1-1942
cupola G49.1-1942
Chains and sprockets, transmission B29a-1930
Chip board CS49-34
Chromic acid and chromates, allowable concentration Z37.7-1943
Circuit breakers C37
Cloth, shrinkage, woven cotton L10-1936
Clothing
body sizes for boys' garments L11.1-1941
Coal
classification M20.1-1938, M20.2-1937
cubic foot weight test K20.1-1936
definitions, bituminous and subbituminous M20.4-1939
handling equipment M10-1928
mines
drainage M6-1931
explosives M14-1930
installing and using electrical equipment ..M2-1926
rock dusting M13-1942
tracks: frogs, switches and turnouts for 20 to 60 lb rail M7.1-1933
70 and 80 lb rail M7.2-1935
transportation, safety code M15-1931
sampling K18-1942, K46-1940
screen analysis, sizes M20.3-1938
Coke
cubic foot weight test K20.2-1936
sampling and analysis K18-1942
shatter test K20.4-1936
tumbler test K20.3-1936
volume of cell space K20.5-1936
Color—see also Pigments
cast stone CS53-35
foundry patterns of wood B45.1-1932
identification of piping systems A13-1928
specification and description Z44-1942
Commercial standards
binders board CS50-34
bookcloth CS57-40
chip board CS49-34
furnaces, gas floor CS99-42
gage blanks B47.1-1941
marking
gold filled and rolled gold plate Z31-1933
karat gold CS67-38
silver in combination with gold CS51-35
mattresses
hospital CS54-35
institution CS55-35

Commercial standards (continued)
stone, cast, colors and finishes for CS53-35
wood, foundry patterns, color system B45.1-1932
Compressed air machinery and equipment B19-1938
Concrete
gypsum A59.1-1941
masonry units A73.1-1942, A79.1-1942, A80.1-1942, A81.1-1942, A84.1-1942
steel reinforcement bars A47-1932, A50.1-1939, A50.2-1936, G43.1-1942, G44.1-1942
steel reinforcement wire A50.3-1936, G45.1-1942
steel reinforcing spirals A38-1933
voids in fine aggregate A19-1937
Construction safety code A10.1-1939
Control apparatus
electric railway C48-1931
industrial C19-1928
Copper, battery assay of K12-1921
Cranes, safety code B30.2-1943
Cylinders and adapters, rotating air B5.5-1932
Cylinders, marking of compressed gas Z48.1-1942

Decimal system
gages, wire and sheet metal B32.1-1941
inch-millimeter conversion B48.1-1933
numerical values, rounding off Z25.1-1940
Definitions, electrical C42-1941
Derricks, safety code B30.2-1943
Drain tile A6-1925
Drawings and drafting room practice Z14.1-1935
Drawings, graphical symbols Z32.2-1941
Drinking fountains Z4.2-1942
Dry cells and batteries C18-1941
Dryers, gas, approval and installation requirements
clothes Z21.5-1940
hair Z21.25-1937
Dumbwaiters
safety code and supplement ...A17.1-1937, A17.3-1942
Dust control
grain elevators and storage units Z12.11-1943
Dust explosions, prevention of
coal pneumatic cleaning plants Z12.7-1942
flour and feed mills Z12.3-1942
manufacture of aluminum bronze powder.Z12-11.1942
starch factories Z12.2-1942
sulphur Z12.12-1943
terminal grain elevators Z12.4-1942
wood flour manufacturing Z12.8-1942
wood working plants Z12.5-1942
Dust ignitions, prevention of
grain elevators, country Z12.13-1942
spice grinding plants Z12.9-1942
Dusts and gases—see Toxic dusts and gases, allowable concentrations

Electric power apparatus; rotation, connections, terminal markings C6-1938
Electric railway control apparatus C48-1931
Electrical apparatus and appliances, plugs and receptacles, attachment C73-1941
Electrical code, National C1-1940
Electrical gloves C59.12-1942
Electrical indicating instruments.C39.1-1938, C39.2-1943
Electrical insulating materials—see Insulating materials
Electrical machinery, rotating C35.1-1943, C50-1943
Electrical safety code, National C2
Electrical terms, definitions C42-1941
Electricity meters (watt hour) ..C12-1941, C12WS-1942
Electroplating operations, safety Z9.1-1941
Elevators
inspection A17.2-1937
safety code and supplement ...A17.1-1937, A17.3-1942
Escalators
safety code and supplement ...A17.1-1937, A17.3-1942
Exhaust systems
design, construction Z9
installation Z33.1-1938
Explosives, in bituminous coal mines M14-1930
Eyes, protection of Z2-1938

Felt, wool, testing L16.1-1942
Fire and explosion prevention, use of inert gas Z12.10-1943
Fire hose, cotton rubber-lined L3.1-1941
Fire prevention safety standards
blower and exhaust systems Z33.1-1938
building construction and materials, fire tests A2.1-1942, A2.2-1942
building exits code A9.1-1942
dust control, explosions and ignitions Z12
electrical code, National C1-1940
electrical safety code, National C2
lightning, code for protection against C5
mines, metal, fire fighting equipment M17-1930
pulverized fuel systems Z12.1-1942
pulverized systems for sugar and cocoa ...Z12.6-1942
Fits, metal, tolerances, allowances and gages for B4a-1925
Floor and wall openings A12-1932
Floors, forms for concrete joist construction ..A48-1932
Forging and hot metal stamping B24-1927
Forging, carbon-steel and alloy-steel blooms, billets and slabs for G9.1-1933
Forms for concrete joist construction, floors ..A48-1932
Foundries
patterns of wood (color) B45.1-1932
protection of workers in B8-1932
Fryers, gas, deep fat, approval and installation requirements Z21.27-1940
Fuel systems, pulverized, installation Z12.1-1942
Furnaces
gas, duct, approval and installation requirements Z21.34-1942
gas floor, gravity circulating type CS99-42

Gage blanks B47.1-1941
Gages
fits, metal B4a-1925
pressure and vacuum B40.1-1939
screw thread B1.2-1941
wire and sheet metal B32.1-1941
Garment sizes—see Clothing, body sizes
Gas-burning appliances, approval and installation requirements
boilers, industrial Z21.14-1934
broilers, unit Z21.3-1940
central heating Z21.13-1943
connectors Z21.32-1942
conversion burners
gas Z21.17-1940
house and water heating appliances Z21.8-1940
counter appliances Z21.31-1941
draft hoods Z21.12-1937
dryers
clothes Z21.5-1940
hair Z21.25-1937
fryers, deep fat Z21.27-1940
furnaces, duct Z21.34-1942
heaters
garage, private Z21.4-1932
space Z21.11-1942
unit Z21.16-1940
water Z21.10-1941, Z21.10WS-1942
hot plates Z21.9-1940
incinerators Z21.6-1932
ironers Z21.7-1932
laundry stoves Z21.9-1940
ovens, baking and roasting Z21.28-1941
pilots, automatic Z21.20-1940
power boilers Z21.33-1942
ranges
domestic Z21.1-1942, Z21.1ES-1942
hotel and restaurant Z21.3-1940
refrigerators Z21.19-1942
regulators, pressure Z21.18-1934
temperature limit controls Z21.29-1941
thermostats Z21.23-1940
tubing
flexible Z21.2-1938
semi-rigid Z21.24-1941
valves
automatic control Z21.21-1935
gas burner Z21.15-1942
relief and automatic shut-off Z21.22-1935
water heating units Z21.26-1941
Gas, city, piping and fittings for Z27-1933
Gas cylinders, marking of compressed Z48.1-1942
Gas, inert, use, for prevention of fire and explosion Z12.10-1943
Gas mask canisters, identification K13-1930
Gas safety code K2-1927
Gears
materials and blanks B6.2-1933
spur
back lash B6.3-1940
tooth form B6.1-1932
Glass, safety Z26.1-1938
Gloves, electrical C59.12-1942
Gold marking Z31-1933, CS67-38
Grade crossings, highway D8-1937
Grandstands, portable steel and wood Z20.1-1941
Graphical symbols—see Symbols
Graphics
engineering and scientific charts for lantern slides Z15.1-1932
engineering and scientific graphs for publication Z15.3-1943
time-series charts Z15.2-1938
Grinding, polishing, and buffing equipment sanitation Z43-1941
Grinding wheels, markings B5.17-1943
Gun metal, chemical analysis of K4-1921
Gypsum
board
sheathing A68.1-1942
wall A69.1-1942
concrete, reinforced A59.1-1941
dental plasters, calcined A65.1-1941
Keene's cement A66.1-1941

Gypsum (continued)
lath A67.1-1942
molding plaster A49.4-1940
plastering A42.1-1942
plasters A49.3-1940
pottery plaster A49.5-1940
specifications for A49.1-1941
testing A70.1-1942

Heads and eyes, protection of Z2-1938
Health standards—see Industrial health and safety standards
Heater, gas approval and installation requirements
garage, private Z21.4-1932
water Z21.10-1941, Z21.10WS-1942
space Z21.11-1942
unit Z21.16-1940
Highways—see Roads; Traffic
Hoists, safety code B30.2-1943
Hose couplings
fire, screw threads B26-1925
screw threads B33.1-1935
Hose, fire, cotton, rubber-lined L3.1-1941
Hot plates, gas, approval and installation requirements Z21.9-1940
Hydrogen sulfide, allowable concentration ... Z37.2-1941

Illuminating engineering nomenclature Z7.1-1942
Inch-millimeter conversion B48.1-1933
Incinerators, gas, approval and installation requirements Z21.6-1932
Industrial health and safety standards
abrasive wheels, safety code B7-1935
accident prevention signs Z35.1-1941
blower and exhaust systems Z33.1-1938
coal handling equipment M10-1928
coal mines
bituminous, explosives in M14-1930
electrical equipment in M2-1926
rock dusting M13-1942
transportation M15-1931
compressed air machinery and equipment ... B19-1938
construction safety code A10.1-1939
cranes, safety code B30.2-1943
derricks, safety code B30.2-1943
drinking fountains Z4.2-1942
dumbwaiters
safety code and supplement .. A17.1-1937, A17.3-1942
electrical code, National C1-1940
electrical safety code, National C2
electroplating operations Z9.1-1941
elevators
inspection A17.2-1937
safety code and supplement .. A17.1-1937, A17.3-1942
escalators
safety code and supplement .. A17.1-1937, A17.3-1942
exhaust systems, design, operation Z9
floor and wall openings A12-1932
forging and hot metal stamping B24-1927
foundries, protection of workers B8-1932
gas mask canisters, identification K13-1930
gas safety code K2-1927
grinding and polishing equipment sanitation . Z43-1941
hand and foot presses B11-1937
heads and eyes, protection of Z2-1938
hoists, safety code B30.2-1943
injury causes, compiling Z16.2-1941
injury rates, compiling Z16.1-1937
ladders A14-1935
ladders and stairs for mines M12-1928
laundry machinery and operations Z8-1941
lighting
industrial A11-1942
protective A85-1942
lightning, code for protection against C5
logging and sawmill safety code B13-1924
metal mines
electrical equipment M24-1932
fire fighting equipment M17-1930

paper and pulp mills, safety code P1-1936
piping systems, identification A13-1928
power presses B11-1937
power transmission, mechanical B15-1927
privy, sanitary Z4.3-1935
railings and toe boards A12-1932
rubber mills and calenders B28a-1927
sanitation, industrial Z4.1-1935
shoes, safety
men's Z41.1-1943, Z41.3-1943, Z41.4-1943 Z41.5-1943, Z41.6-1943
women's Z41.2-1943
textile safety code L1-1929
tools, machine, electrical standards C74-1942
toxic dusts and gases, allowable concentrations Z37.1-1941, Z37.2-1941, Z37.3-1941 Z37.4-1941, Z37.5-1941, Z37.6-1942 Z37.7-1943, Z37.8-1943
window cleaning, safety code for A39-1933

Industrial health and safety standards (continued)
wire rope for mines M11-1927
woodworking plants, safety code for O1-1930
Injury causes, compiling Z16.2-1941
Injury rates, compiling Z16.1-1937
Insulating materials
ceramic radio, Class L C75.1-1943
impact resistance, methods of test C59.11-1941
molded, methods of test C59.1-1940
oils, methods of test C59.2-1941
powders, molding, methods of test C59.10-1941
resistivity of, methods of test C59.3-1939
rubber matting for use around electrical apparatus or circuits not exceeding 3,000 volts to ground C59.4-1935
rubber tape C59.6-1939
Insulator tests C29a-1930
Iron—see Cast iron; Malleable iron
Ironers, gas, approval and installation requirements Z21.7-1932

Keys—see Shafting

Ladders, safety code for A14-1935
Ladders and stairs for mines M12-1928
Lamp bases, screw threads for C44-1931
Lantern slides
engineering and scientific charts Z15.1-1932
projectors Z38.7.2, Z38.7.3, Z38.7.4
Laundry machinery and operations Z8-1941
Lead
blue, basic sulfate K48-1941
dry red K16.1-1937
red K24-1941
white, basic carbonate K23-1941
white, basic sulfate K47-1941
Lighting
industrial A11-1942
protective A85-1942
schools A23-1938
Lightning arresters C62-1936
Lightning, protection against, safety code
buildings C5.2-1937
persons C5.1-1937
structures containing inflammable liquids and gases C5.3-1937
Linseed oil
boiled K35-1937
raw K34-1937
Locomotives, railway C35.1-1943
Logging and sawmill safety code B13-1924

Machine tools—see Tools, machine
Malleable iron
castings G48.1-1942
cupola G49.1-1942
Manganese, allowable concentration Z37.6-1942
Manganese bronze, chemical analysis K3-1935
Manhole frames and covers A35.1-1941
Marking
articles
gold filled and rolled gold Z31-1933
karat gold CS67-38
silver in combination with gold CS51-35
compressed gas cylinders Z48.1-1942
grinding wheels B5.17-1943
Mattresses
hospitals CS54-35
institutions CS55-35
Mercury, allowable concentration Z37.8-1943
Metal mines
electrical equipment M24-1932
fire fighting equipment M17-1930
mechanical loading M19-1928
transportation in M18-1928
Meters
electrical indicating instruments C39.1-1938, C39.2-1943
electricity (watt hour) C12-1941, C12WS-1942
sound level (noise) Z24.3-1936
Microphones, calibration of Z24.4-1938
Millimeter, inch, conversion B48.1-1933
Mines, coal—see Coal mines
Mines, metal—see Metal mines
Motion pictures Z22
Motor vehicles—see Automobiles

National electrical code C1-1940
National electrical safety code C2
Noise measurement Z24.1-1942, Z24.2-1942, Z24.3-1936, Z24.4-1938
Numerical values, rounding off Z25.1-1940
Nuts B18d-1930, B18.2-1941

Ores, screen testing M5-1932
Outlet boxes C33a-1929
Ovens, baking and roasting, gas, approval requirements Z21.28-1941

Paper and pulp mills, safety code P1-1936
Patterns, foundry (color) B45.1-1932
Periodicals, reference data Z29.1-1935
Petroleum products and lubricants, tests
autogenous ignition temperatures Z11.23-1932
burning quality
kerosine oils Z11.17-1939
long-time burning oil for railway use...Z11.19-1936
mineral seal oil Z11.18-1930
carbon residue
(Conradson) Z11.25-1941
(Ramsbottom) Z11.47-1942
cloud and pour points Z11.5-1939
color
refined petroleum oil, by means of Saybolt chromometer Z11.35-1938
crankcase oil, dilution Z11.29-1935
definition of terms Z11.28-1939
distillation of crude petroleum Z11.32-1941
flash and fire points by means of open cup Z11.6-1933
flash point by means of the Pensky-Martens closed tester Z11.7-1942
flash point of volatile flammable liquids..Z11.24-1936
fuel oil, thermal value Z11.14-1939
gas oils, testing Z11.26-1941
gasoline, detection of free sulfur and corrosive sulfur compounds Z11.21-1930
gasoline, naphtha, kerosine and similar petroleum products, distillation Z11.10-1940
gravity Z11.31-1939
grease, analysis Z11.16-1940
gum content of gasoline Z11.36-1942
lubricating oils
precipitation number Z11.30-1940
steam emulsion Z11.15-1936
natural gas gasoline, distillation Z11.11-1940
paraffin wax, melting point Z11.4-1942
petrolatum, test for melting point Z11.22-1932
plant spray oils
distillation test Z11.43-1941
unsulfonated residue Z11.41-1940
sampling petroleum products Z11.33-1935
stoddard solvent Z11.42-1940
sulfur
in petroleum oils heavier than illuminating oil Z11.13-1939
tetraethyl lead in gasoline Z11.48-1942
vapor pressure Z11.44-1942
viscosity Z11.2-1938
viscosity, conversion of Kinematic to Saybolt universal Z11.46-1941
viscosity index Z11.45-1941
viscosity-temperature chart for liquid petroleum products Z11.39-1939
volume correction table for petroleum oils Z11.1-1936
water Z11.9-1940
water and sediment Z11.8-1940
Photography Z38
Photometric standards, illuminating engineering nomenclature Z7.1-1942
Pigments
acetone extract in dry lampblack and dry bone black K55-1941
alkalinity or acidity K51-1941
bleeding K52-1941
bone black K36-1941
chrome green, reduced K28-1941
chrome oxide green K37-1941
chrome yellow K27-1941
coarse particles K42-1937
hygroscopic moisture (and other matter volatile under the test conditions) K53-1941
iron oxide, mineral K25-1941
lampblack K26-1941
lead
blue, basic sulfate K48-1941
dry red K16.1-1937
red K24-1941
white, basic carbonate K23-1941
white, basic sulfate K47-1941
mercuric oxide, dry K59-1941
oil absorption K54-1941
para red, commercial K31-1941
para red toner, C.P. K49-1941
prussian blue K29-1941
routine analysis K44-1937
specific gravity K41-1939
tinting strength
mass color K57-1941
white K56-1941
titanium dioxide K45-1941
white, analysis K15-1939
yellow and orange, containing chromium compounds, blue and chrome green K58-1941
zinc oxide K22-1941
zinc yellow (zinc chromate), C.P. K50-1941
Pipe
cast iron
cement mortar lining A21.4-1939
culvert G26.1-1942
Pipe—cast iron (continued)
pit cast, for water or other liquids A21.2-1939
soil A40.1-1935
strength and thickness, computation ...A21.1-1939
welded
electric-fusion-welded (8 in. to but not incl. 30 in.) B36.9-1942
electric-fusion-welded, high temperature B36.11-1942
electric-fusion-welded (30 in. and over) .B36.4-1942
electric-resistance-welded B36.5-1942
forge-welded steel B36.6-1935
lap-welded and seamless B36.3-1942
lock-bar steel B36.7-1935
riveted steel and wrought iron B36.8-1935
spiral-welded steel or iron B36.16-1942
welded and seamless steel B36.1-1942
welded-wrought iron B36.2-1939
zinc coated, welded G8.7-1941
wrought iron and steel B36.10-1939
see also Pipe flanges and fittings: Tubes and tubing
Pipe flanges and fittings
alloy steel castings G36.1-1942
bolting materials, alloy steel ..G17.2-1939, G38.1-1942
brass fittings, copper tubes A40.2-1936
carbon steel castings G17.1-1942
cast-iron, all sizes, for maximum WSP of 25 lb per sq in. B16b2-1931
cast-iron, class 125 .....B16a-1939
cast-iron, all sizes, for maximum WSP of 250 lb per sq in. B16b-1928
cast-iron, 800 lb hydraulic B16b1-1931
cast-iron screwed drainage fittings B16.12-1942
cast-iron screwed fittings for maximum WSP of 125 and 250 lb per sq in. B16d-1941
cast-iron sprinkler fittings (includes B16g1-1937) B16g-1929
face-to-face dimensions of ferrous flanged, welding end valves B16.10-1939
forged or rolled steel G17.3-1940, G37.1-1942, G46.1-1942
malleable iron screwed fittings for maximum WSP of 150 lb per sq in. B16c-1939
soldered-joint fittings A40.3-1941
steel butt-welding fittings B16.9-1940
steel flanged fittings B16e-1939, B16e5-1943
welding neck flanges B16e-1939, B16e5-1943
see also Tubes and tubing
Pipe plugs B16e2-1936
Pipe threads B2.1-1942
Piping
code for pressure B31.1-1942
identification system A13-1928
Plates, steel G20-1939, G40.1-1942
Plugs and receptacles, attachment C73-1941
Plumbago crucibles H13-1925
Plumbing and plumbing equipment A40.1-1935, A40.2-1936, A40.3-1941, A40.4-1942
Poles, tubular steel C13-1926
Poles, wood
specifications and dimensions
chestnut O5.3-1941
douglas fir O5.6-1941
lodgepole pine O5.5-1941
northern white cedar O5.1-1941
southern pine O5.4-1941
western red cedar O5.2-1941
ultimate fiber stresses O5a-1933
Power boilers, gas burning equipment Z21.33-1942
Power transmission, mechanical, safety code..B15-1927
Preferred numbers Z17.1-1936
Presses: power, foot and hand, safety code ..B11-1937
Pressure piping B31.1-1942
Privy, sanitary Z4.3-1935
Pulverized fuel systems Z12.1-1942
Pulverizing systems for sugar and cocoa ...Z12.6-1942

Quality control Z1.1-1941, Z1.2-1941, Z1.3-1942

Radio
broadcast receivers C16.3-1939
capacitors
dry electrolytic C16.7-1943
mica-dielectric C75.3-1942
paper-dielectric C16.6-1943
dielectric materials, ceramic, Class H C75.4-1943
home replacement parts, list C16.8-1943
insulating materials, ceramic C75.1-1943
loudspeaker testing C16.4-1942
power and audio transformers and reactors C16.9-1943
receiving appliances, power-operated C65.1-1942
vacuum tube, socket, dimensions C16.2-1939
voltage measurement, dielectric tests C68.1-1942
volume measurement of electrical speech and progress waves C16.5-1942
Railings and toe boards A12-1932
Railroad, highway, grade crossing protection ..D8-1937

Rails
joint plates for nine-inch girder-grooved and guard E3-1923
joint plates for seven-inch girder-grooved and guard E2-1923
nine-inch girder-grooved E5-1933
nine-inch girder-guard E7-1933
seven-inch girder-grooved E4-1933
seven-inch girder-guard E6-1933
seven-inch, 82 lb plain girder E8-1933
seven-inch, 92 lb plain girder E9-1933
seven-inch, 102 lb plain girder E11-1933
Railway locomotives C35.1-1943
Railways, electric, control apparatus C48-1931
Ranges, gas, approval and installation requirements
domestic Z21.1-1942, Z21.1ES-1942
hotel and restaurant Z21.3-1940
Refrigeration, mechanical B9-1939
Refrigerators
domestic, code for testing B38c1-1931
gas Z21.19-1942
Relays, power switchgear C37.1-1937
Respiratory organs Z2-1938
Rivets and riveting material
large B18.4-1937
small B18a-1927
steel G21-1939, G28.1-1942, G42.1-1942
tinners', coopers', belt B18g-1929
Roads
materials for cement grout filler for brick and stone block pavements A31-1924
stone, slag, gravel, sand and stone block, highway materials A26-1930
Rock, toughness of, test for A5-1930
Rods
bars and shapes, copper base alloy H7-1939
brass, for screw machines H8-1942
copper, hot-rolled H4.7-1942
Rosin, determination of toluol insoluble matter in K21.1-1936
Rotating electrical machinery C35.1-1943, C50-1943
Rounding off numerical values Z25.1-1940
Rubber
gloves C59.12-1942
method of test J1.1-1942, J2.1-1942, J3.1-1942, J4.1-1942, J5.1-1942
mills and calenders B28a-1927

Safety standards
abrasive wheels, safety code B7-1935
accident prevention signs Z35.1-1941
automobiles, inspection requirements D7.1-1941
blower and exhaust systems Z33.1-1938
building construction and materials, fire tests A2.1-1942, A2.2-1942
building exits code A9.1-1942
coal handling equipment M10-1928
coal mines
bituminous, explosives in M14-1930
electrical equipment in M2-1926
rock dusting M13-1942
transportation M15-1931
compressed air machinery and equipment B19-1938
construction safety code A10.1-1939
cranes, safety code B30.2-1943
derricks, safety code B30.2-1943
drinking fountains Z4.2-1942
dumbwaiters
safety code and supplement A17.1-1937, A17.3-1942
dust control, explosions and ignitions Z12
electrical code, National C1-1940
electrical safety code, National C2
electroplating operations Z9.1-1941
elevators
inspection A17.2-1937
safety code and supplement A17.1-1937, A17.3-1942
escalators
safety code and supplement A17.1-1937, A17.3-1942
exhaust systems, design, operation Z9
floor and wall openings A12-1932
forging and hot metal stamping B24-1927
foundries, protection of workers B8-1932
gas cylinders, marking of compressed Z48.1-1942
gas mask canisters, identification K13-1930
gas safety code K2-1927
glass, safety, motor vehicles Z26.1-1938
grade crossings, highway D8-1937
grandstands, portable steel and wood Z20.1-1941
grinding and polishing equipment
sanitation Z43-1941
hand and foot presses B11-1937
heads and eyes, protection of Z2-1938
hoists, safety code B30.2-1943
injury causes, compiling Z16.2-1941
injury rates, compiling Z16.1-1937
ladders A14-1935
ladders and stairs for mines M12-1928
laundry machinery and operations Z8-1941
lighting
industrial A11-1942
Safety standards—lighting (continued)
protective A85-1942
schools A23-1938
lightning, code for protection against C5
logging and sawmill safety code B13-1924
metal mines
electrical equipment M24-1932
fire fighting equipment M17-1930
paper and pulp mills, safety code P1-1936
piping systems, identification A13-1928
power presses B11-1937
power transmission, mechanical B15-1927
privy, sanitary Z4.3-1935
pulverized fuel systems Z12.1-1942
pulverizing systems for sugar and cocoa Z12.6-1942
railings and toe boards A12-1932
railroad, highway, grade crossing protection D8-1937
refrigeration, mechanical B9-1939
rubber mills and calenders B28a-1927
sanitation, industrial Z4.1-1935
shoes, safety
men's Z41.1-1943, Z41.3-1943, Z41.4-1943, Z41.5-1943, Z41.6-1943
women's Z41.2-1943
textile safety code L1-1929
tools, machine, electrical standards C74-1942
toxic dusts and gases, allowable concentrations Z37.1-1941, Z37.2-1941, Z37.3-1941, Z37.4-1941, Z37.5-1941, Z37.6-1942, Z37.7-1943, Z37.8-1943
traffic
control devices D6-1935
control signal heads, adjustable face D10.1-1942
glass, safety Z26.1-1938
grade crossing protection D8-1937
window cleaning, safety code for A39-1933
wire rope for mines M11-1927
woodworking plants, safety code O1-1930
Sanitation, industrial Z4.1-1935
School lighting A23-1938
Screw threads
acme and other translating B1.3-1941
bolts, nuts, machine screws B1.1-1935
fire hose couplings B26-1925
gages and gaging B1.2-1941
hose coupling B33.1-1935
pipe B2.1-1942
rolled, for lamp bases C44-1931
straight, for high-temperature bolting B1.4-1942
Screws
slotted head machine and wood screw heads B18c-1930
socket set and socket head B18.3-1936
Shaft couplings, for hydro-electric units B49-1932
Shafting
shafting and stock keys B17.1-1934
transmission B17c-1927
Woodruff keys B17f-1930
Sheet metal
gages B32.1-1941
Sheets
wrought iron, uncoated G23-1939
wrought iron, zinc-coated G8.8-1937
zinc coated G8b1-1931
Shoes, safety
men's Z41.1-1943, Z41.3-1943, Z41.4-1943, Z41.5-1943, Z41.6-1943
women's Z41.2-1943
Shrinkage, woven cotton cloth L10-1936
Sieves, testing Z23.1-1939
Silver in combination with gold, marking CS51-35
Sleeving, tubular L13.1-1942
Soap, liquid K14-1930
Solder metal H11-1924
Sound level meters (noise) Z24.3-1936
Statistics
injury causes Z16.2-1941
injury rates Z16.1-1937
quality control Z1.1-1941, Z1.2-1941, Z1.3-1942
Steel
boiler G28.1-1942, G29.1-1942, G30.1-1942, G31.1-1942, G32.1-1942, G33.1-1942, G34.1-1942, G35.1-1942
bolting material, alloy G17.2-1939
bridges and buildings G24-1942
carbon and alloy, blooms, billets and slabs for forgings G9.1-1933
castings G17.1-1942, G50.1-1943, G51.1-1943, G52.1-1943
locomotive G39.1-1942
plates G20-1939, G40.1-1942
rivet G21-1939, G28.1-1942, G42.1-1942
silicon G41.1-1942
thermal analysis of Z30.2-1936
zinc coating G8
Steel, concrete reinforcement
bars
billet A50.1-1939
rail A50.2-1936
wire, cold drawn A50.3-1936
Steel pipe—see Pipe

Steel reinforcing spirals A38-1933
Stone, cast, colors and finishes for CS53-35
Storage batteries C40-1928
Stoves, gas laundry, approval and installation requirements Z21.9-1940
Street and highway traffic control D6-1935
Surface roughness B46
Symbols—see also abbreviations
graphical
architectural plans, electrical Z32.9-1943
drawings Z32.2-1941
power, control and measurement, electrical Z32.3-1943
radio Z32.5-1942
railway signaling Z10g5-1933
telephone and telegraph Z32.5-1942
welding Z32.1-1942
letter
aeronautical Z10e-1930
electric traction Z10g5-1933
electrical quantities Z10g1-1929
heat and thermodynamics Z10c-1931
hydraulics Z10.2-1942
mathematical Z10f-1928
mechanics, solid bodies Z10.3-1942

Temperature limit controls, listing requirements, gas burning appliances Z21.29-1941
Terminal markings, electric power apparatus ..C6-1938
Testing apparatus, textile machines L15.1-1943
Textiles
safety code L1-1929
shrinkage, woven cotton cloth L10-1936
testing fabrics L5-1939
testing machines L15.1-1943
Ties—cross and switch O3-1926
Tile, structural A74.1-1942, A76.1-1942, A77.1-1942, A83.1-1942
Timber
piles, round O6-1939
small clear specimens O4a-1927
structural O7-1939
static tests O4b-1927
Time-series charts Z15.2-1938
Toluol K21.1-1936
Tools, machine
adjustable adapters B5.11-1937
chucks and chuck jaws B5.8-1936
circular and dove tail forming tool blanks.. B5.7-1936
electrical standards C74-1942
engine lathes B5.16-1941
jig bushings B5.6-1941
lathe spindle noses B5.9-1936
machine tapers B5.10-1937
milling cutters B5c-1930
reamers B5.14-1941
rotating air cylinders and adapters B5.5-1932
single-point cutting tools, terminology B5.13-1939
splines, involute B5.15-1939
T-slots, bolts, nuts, tongues, cutters B5.1-1941
taps, cut and ground threads B5.4-1939
tool holder shanks and tool post openings .. B5b-1929
twist drills B5.12-1940
Toxic dusts and gases, allowable concentrations
benzene Z37.4-1941
cadmium Z37.5-1941
carbon disulfide Z37.3-1941
carbon monoxide Z37.1-1941
chromic acid and chromates Z37.7-1943
hydrogen sulfide Z37.2-1941
manganese Z37.6-1942
mercury Z37.8-1943
Traffic
control devices for streets and highways ... D6-1935
control signal heads, adjustable face D10.1-1942
glass, safety Z26.1-1938
grade crossing protection D8-1937
Transformers, regulators and reactors C57.1-1942, C57.2-1942, C57.3-1942
Trolley construction, overhead C15-1935
Tubes and tubing
boiler tubes
lap-welded and seamless steel and lap-welded iron B36.12-1942
electric-resistance-welded steel and open-hearth iron B36.13-1942
seamless steel, high-pressure service .. B36.14-1942
medium-carbon seamless steel B36.15-1942
Tubes and tubing—boiler tubes (continued)
seamless alloy-steel B36.17-1942
electric-resistance-welded, high-pressure service B36.18-1942
brass-fittings for flared copper tubes A40.2-1936
copper water tube H23.1-1941
soldered-joint fittings A40.3-1941
see also Pipe; Pipe flanges and fittings
Turpentine
sampling and testing K33-1937
spirits K32-1937

Valves
carbon steel, castings for G17.1-1942
face-to-face dimensions, ferrous flanged welding end B16.10-1939

Welding
electric arc C52.1-1933
resistance C52.2-1933
Wheels, grinding, markings B5.17-1943
Window cleaning, safety code for A39-1933
Wire and cable
aluminum conductors C11-1927
bare concentric stranded C8.14-1938
cold-drawn, concrete reinforcement A50.3-1936
copper
hard drawn H4.2-1941
medium-hard-drawn H4.3-1941
magnet, round
cotton covered C8.5-1936
enameled C8.7-1936
heavy walled enameled C8.20-1939
silk covered C8.6-1936
soft or annealed H4.1-1942
tinned, soft or annealed H4.4-1940
tree wire, rubber-insulated C8.16-1940
cotton braid, insulated C8.12-1942
definitions and general standards C8.1-1932
metallic coverings C8.15-1942
paper, impregnated insulated lead-covered power cable C8.10-1942
rubber insulation
class AO C8.17-1936
code C8.11-1936
slow burning (type SB) C8.9-1942
trolley wire
bronze H4.5-1940
copper H4.6-1940
varnished cloth insulation for lead-covered or braid-covered lead cable C8.13-1942
weather resisting
saturants and finishes for aerial rubber insulated C8.19-1939
URC type C8.18-1942
zinc coated (galvanized) G8.3-1935, G8.4-1935, G8.6-1935
Wire bars, cakes, slabs, billets, ingots and ingot bars
electrolytic copper H17.2-1942
lake copper H17.1-1942
Wire ropes for mines M11-1927
Wiring, electric (National Electrical Code) C1-1940
Wood—see Timber
Wood poles—see Poles, wood
Woodruff keys B17f-1930
Woodworking plants, safety code O1-1930
Wool felt, testing L16.1-1942
Wrought iron sheets
uncoated G23-1939
zinc-coated G8.8-1937

Zinc
coating
chain-link fence fabric galvanized after weaving G8.5-1935
pipe, black and hot dipped, welded and seamless steel, ordinary uses G8.7-1941
sheets G8b1-1931
structural steel shapes, plates, bars G8.1-1933
telephone and telegraph line wire G8.3-1935
tie wire, iron and steel G8.4-1935
wire strand (cable), iron or steel G8.6-1935
rolled H25.1-1943
slab (spelter) H24.1-1943

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